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THE JOURNAL OF THE GEORGE EASTMAN HOUSE OF PHOTOGRAPHY

NUMBER 1 • MARCH 1960

THE JOURNAL OF P

IMAGE

PHOTOGRAPHY AND MOTION PICTURES

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IMAGE is published quarterly for the George Eastman House Associates, 900 East Avenue, Rochester 7, New York.

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MARCH 1960

VOLUME 9 • NUMBER 1

EDITORIAL

A GENEROUS NUCLEUS

A MUSEUM, ONCE IT HAS BECOME established and known, and its purposes brought into focus, attracts not only visitors and students, but also historical material which otherwise might face destruction. The vast collection which it is our privilege to preserve at the George Eastman House is being constantly augmented by gifts from all over the world. To the many friends who have so generously contributed to our work over the past eleven years, we are grateful. We realize that without their help, much historical material of significance would never have found a permanent home here. Although we are constantly on the watch for apparatus, books, letters and documents to complete our collections, it is often impossible for us to seek out this material. We rely heavily upon the interest of the Associates, and welcome the flood of letters which we receive informing us about historical material available to us, usually for the asking.

In certain areas our collection has grown rapidly but there are many fields in which our holdings are small, and where the gifts of our friends are especially welcome. We shall, from time to time, point out our deficiencies, in order to guide and assist those who wish to help us in our search, and thus aid us to approach the goal of making the George Eastman House collections fully comprehensive.

A field which is poorly represented, not only in the Eastman House collection, but in other museums, is the enormous contribution which photography has made to medical science through radiography.

To focus attention on this important branch of photography, we are proud to present in this issue an article by Mr. Arthur W. Fuchs, Supervisor, Medical Tech-

nical Service, Eastman Kodak Company. Mr. Fuchs is especially qualified to write upon the history of radiography, not only because of his own long experience in the field, but also because his father, Wolfram C. Fuchs, was a pioneer in the application of x-rays to medicine. Yet in spite of this direct experience of two generations, Mr. Fuchs points out that "the whole story has yet to be told. The occasion for this situation is due in large part to the fact that there has not been a single repository of historical material of any sizeable volume to make it worthwhile to researchers in the field.

"Perhaps the years have passed too swiftly or the tendency to discard the old and take on the new has caused much of the old apparatus, radiographs, tubes, books and journals, and analecta to disappear from the scene. What is left is scattered about the country and perhaps slowly deteriorating because of lack of care, except for those isolated instances where it is housed in some sort of museum."

We are happy to announce that Mr. Fuchs has most generously presented to the George Eastman House a valuable collection of books, journals, reprints and tubes from his own collection and that of his father, to serve as a nucleus around which a comprehensive research collection can be formed. Already we have received the active cooperation of the profession, in particular in the gift of Dr. George W. Grier of Pittsburgh, Pennsylvania.

We will welcome additions to this fine nucleus, which will be catalogued, stored under optimum conditions, and made available to the public and the profession in exhibitions and as a study collection.

BEAUMONT NEWHALL, *Director*

RADIOGRAPHY OF 1896

by ARTHUR W. FUCHS

TOWARD THE END OF THE 19TH CENTURY, a momentous discovery was made in a physics laboratory at the University of Würzburg, Germany. It was the culmination of over a century of the most advanced intellectual study and achievement by scientific men. This event occurred on November 8, 1895. Professor Wilhelm Conrad Röntgen, while studying electrical discharges in partially evacuated glass tubes, observed a phenomenon that led to his detection of a "new kind of rays." These rays possessed the almost unbelievable property of penetrating the human body and other objects that normally were opaque to visible light, yet they could not be seen by the human eye. Röntgen named this radiation the *x-rays*.

This far-reaching discovery initiated tremendous activity in all sciences. The importance of this discovery to medicine was as great as the discovery of anesthesia, for it inaugurated a means for solving medical and surgical problems. The usefulness of the x-rays as a medical diagnostic aid was accepted with surprising optimism although there was also skepticism as to its value. However, within a month after the announcement, patients were seeking x-ray examinations from anyone possessing the necessary apparatus. The whole complexion of surgery changed for the better. The advent of anesthesia and asepsis had started the trend, but with radiography the surgeon could anticipate what was to be done and plan accordingly. It became unfashionable to use the knife blindly. The whole field of medicine began to move forward rapidly, and surgical daring became based on knowledge gained *before* operation.

The origin of the tubes used by Röntgen goes back in time to a German instrument maker named Heinrich Geissler. In his study of electric glow discharges, Geissler (1858) constructed glass tubes and evacuated them to low pressures. He inserted platinum wires in the tubes to facilitate the flow of electric current. By varying the pressure, the discharges could be studied. With the use of various gases in the tubes, different colors could be produced.

Later, Sir William Crookes (1879) extensively investigated these gas tube phenomena and constructed other tubes more efficient in design than the Geissler tubes. It was this improved type of tube that Röntgen employed during his memorable researches.

Wilhelm Conrad Röntgen, discoverer of x-rays.

While working with an activated Crookes tube that had been enclosed in black paperboard to confine ultraviolet or visible light, Röntgen noticed a glow from a nearby piece of cardboard that had been coated with barium platinocyanide crystals. When objects were interposed between the tube and this cardboard, internal details of the objects could be observed. To verify this phenomenon, Röntgen placed a box of brass weights on a photographic plate. After an indeterminate exposure, the developed plate revealed a photographic image of all the details of the closed box and its contents. In the course of his experiments, it was only natural for Röntgen to make a radiograph of Mrs. Röntgen's hand. This was the first radiograph of a human body part.

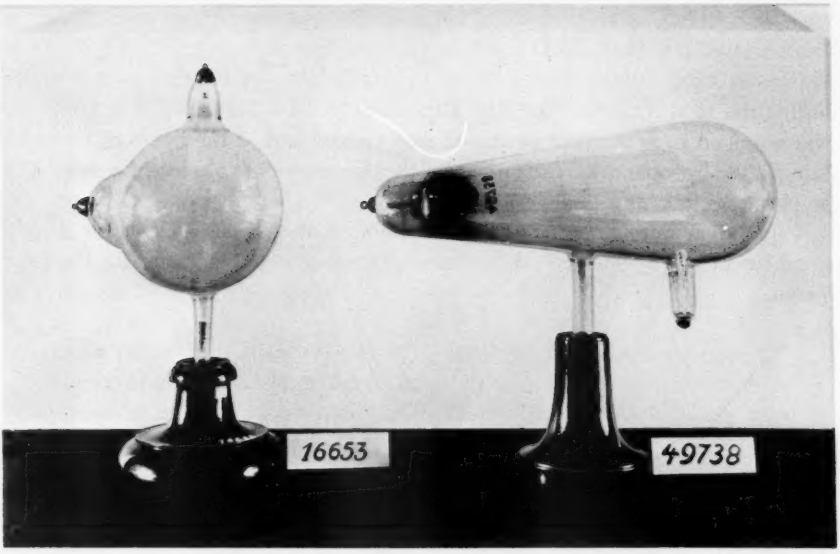
Röntgen made an exhaustive study of the x-rays and published his findings in three papers. The first was presented to the President of the Würzburg Physical Medical Society of December 28, 1895*. Röntgen's reports were so truly scientific that they left no doubt either of the truth or of the great importance of his work. About this time, Röntgen sent some of his x-ray pictures to his friend Dr. Franz Exner, in Vienna, who published an article about them in the January 5, 1896, issue of the *Wiener Presse*. This was the first newspaper story on the subject and was the initial source of all the world-wide publicity given to the discovery. It was cabled from London to the New York Herald under date of January 6, 1896, and printed in the January 7 issue as follows:

> "The noise of war's alarms should not distract attention from the marvellous triumph of science which is reported from Vienna. It is announced that Prof. Röntgen of the Würzburg University has discovered a light which, for the purposes of photography, will penetrate wood, flesh, and most other organic substances. The Professor has succeeded in photographing metal weights which were in a closed wooden case, also a man's hand which shows only the bones, the flesh being invisible. The *Chronicle* correspondent says the discovery is simple. The Professor takes a so-called Crookes pipe, viz.: a vacuum glass pipe with an induction current going through it, and by means of rays which the pipe emits photographs on ordinary photographic plates. In contrast with the ordinary rays of light these rays penetrate organic matter and other opaque substances just as ordinary rays penetrate glass . . . The Professor is already using his discovery to photograph broken limbs and bullets in human bodies."

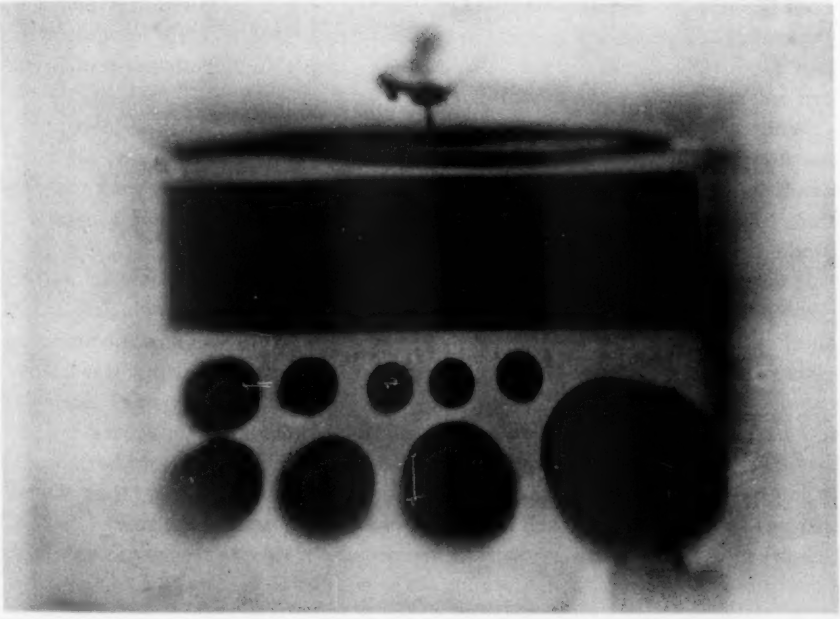
The physics laboratories of the world concentrated their attention on duplicating Röntgen's work. The press camped on their thresholds, anxious to report what was being done. Almost immediately every person, school, or college having the necessary apparatus began x-raying the hands or feet of willing human subjects. Every form of inanimate or animate object was exposed to see what was inside. But the name of the person who made the first radiograph in America seems lost in the historical past.

Four days after the newspaper notice of Röntgen's discovery, Thomas Edison had confirmed all of Röntgen's findings. With four assistants and devoting all of his

*"Eine neue Art von Strahlen." Erste Mitteilung, *Sitzungsberichte der Physikalisch-Medizinischen Gesellschaft zu Würzburg*. December, 1895. For English translation see *British Journal Photographic Almanac*, 1897, pp. 787-91.



Photograph of gas discharge tubes used by Röntgen during his experiments that led to the discovery of the x-rays.



Radiograph (positive print) of box of weights made by Röntgen in 1895.

time and energy, he sought to find some commercial use of the x-rays. Later, he made x-ray tubes which he hoped to sell for fifty cents!

In early April 1896, Edison built four portable x-ray outfits that were installed during the 1896 National Electrical Exposition in New York City. The apparatus was arranged so as to allow anyone to step up and look at the bones of his hand. Long lines of people stood each night for the opportunity to observe the wonderful properties of this "new light."

A quotation from Röntgen's original communication is significant, for it indicated the importance of the photographic plate as a means of *recording* the x-ray image.

> "Of especial interest in many ways is the fact that photographic dry plates show themselves susceptible to x-rays. We are thus in a position to corroborate many phenomena in which mistakes are easy, and I have, whenever possible, controlled each important ocular observation in fluorescence by means of photography."

In 1896 it was a task to produce a satisfactory radiograph, for the workers had apparatus that was ill designed to produce x-rays in sufficiently controlled quantities. When one considers the fact that the photographic plate of that time absorbed only a paltry amount of radiation, it is really remarkable that anything identifiable was obtained.

At first, any sort of x-ray image was acceptable, but when the x-rays began to be used in medicine and in other fields, the deficiencies of photosensitive emulsions became a matter of major concern. It is evident that Röntgen early recognized this fact, for he wrote to his friend Schleussner, the dry plate manufacturer of Frankfurt am Main, asking him to make some special x-ray plates.

When news of Röntgen's discovery reached America on January 7, 1896, photosensitive materials had been made to suit the needs of the photographer. The silver emulsions coated on plates or paper were thin and their use for x-ray work was anything but satisfactory. As was proved later, thick silver emulsions were necessary to produce a wide range of densities.

It was not without cause that all x-ray experimenters of that time clamored for greater speed in the sensitive materials. The flexible celluloid film which Eastman and Reichenbach introduced in 1889 was later successfully used as a substitute for glass plates in radiography. Eastman's "Nikko" photographic paper was recommended (1896) for x-ray work, but the needed exposure was greater than that required for plates. Gradually bromide papers of increased sensitivity became available. Photographic paper was useful because several sheets could be included in an exposure envelope or combined with a glass plate. With one exposure several images could be obtained, each revealing details not present in the other.

It can now be said that x-ray workers who produced excellent x-ray pictures were usually good photographers in the amateur or professional sense. Darkroom manipulation became as important as the exposure in the production of the radiograph. In reviewing the early x-ray literature, one is impressed with the remarkable results secured by some of the pioneer workers with no more elaborate equipment than a small induction coil, a gas tube, and an inadequate photographic dry plate – a

Radiograph (positive print) of Mrs. Röntgen's hand made in November of 1895.

combination which required exposures of one or more hours to make a radiograph of the hand.

Photosensitive materials were so poor in 1896 that Edison and others recommended the Edison fluoroscope for directly viewing the x-ray image. This fluoroscope, as initially developed, was composed of a tapering box provided with a fluorescent screen at one end and at the other end an opening edged with some soft, dark-colored material such as feathers or velvet into which the upper part of the face could be fitted closely to exclude light. The screen was made either of cardboard, wood, thin aluminum, thin hard rubber, or any other substance which the x-rays could easily penetrate. The inner side of this screen was coated with crystals of calcium tungstate. The whole apparatus was then made as light-tight as possible, with the exception of the opening at the top which was intended for the observer to look through.

Images produced by the fluoroscope were found to be hazy and all-defined. What was needed, obviously, was a medium that would resolve the tiny structural details of bone and flesh. The producers of photosensitive materials were urged to make a special plate that would reveal minute details. The first plate made expressly for x-ray work was manufactured in Philadelphia (1896) by John Carbutt who employed a thicker silver emulsion and recommended the use of a high contrast developer. Much of Carbutt's experimental work was accomplished with the cooperation of Professor Arthur Goodspeed of the University of Pennsylvania. Carbutt's "Röntgen X-ray Plate" made it possible to reduce the exposure and yield an image with greater contrast.

Plates, films, or paper exposed to the x-rays were processed by the photographic methods then in vogue. All varieties of formulas were employed, but they all tended to produce weak images. Whatever the chemicals used, development times ranged from 15 minutes to an hour or more with constant agitation. Fixation generally required one-half to two or three hours. The photographic experience of the x-ray worker was invaluable because the success of the exposure often depended upon the expertness with which the exposed material was processed. The developing image was watched continually so that when development was completed the material could be removed promptly for fixation.

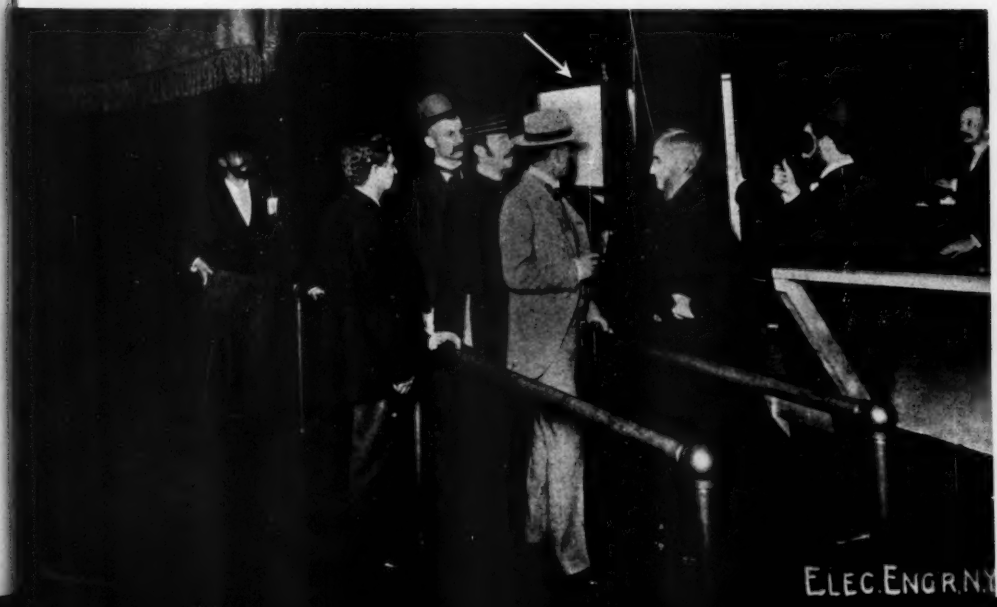
Every means possible was employed in those early days to reduce the very long exposures that ranged from 20 minutes to hours. A fortunate and significant fact of photography came to be of great importance after the x-rays were discovered. The sensitivity of a photographic emulsion is based on its response to light of various wave lengths. At the time x-rays were discovered, photographic emulsions were largely sensitive to blue and ultraviolet light, and less so to green.

Röntgen's experiments entailed the use of a fluorescent screen made of barium platinocyanide. When x-rays struck these crystals, a yellow-green fluorescent light was emitted. Edison was not satisfied with the low intensity of the light emitted from these screens. He energetically experimented with thousands of chemicals in his efforts to find another substance that would fluoresce more strongly upon x-ray bombardment. Finally, he found that calcium tungstate crystals were the answer since the intensity of the emitted light was greater than that from a barium platinocyanide screen. Also, the emitted light was blue, a fact which did not seem too significant at the time.

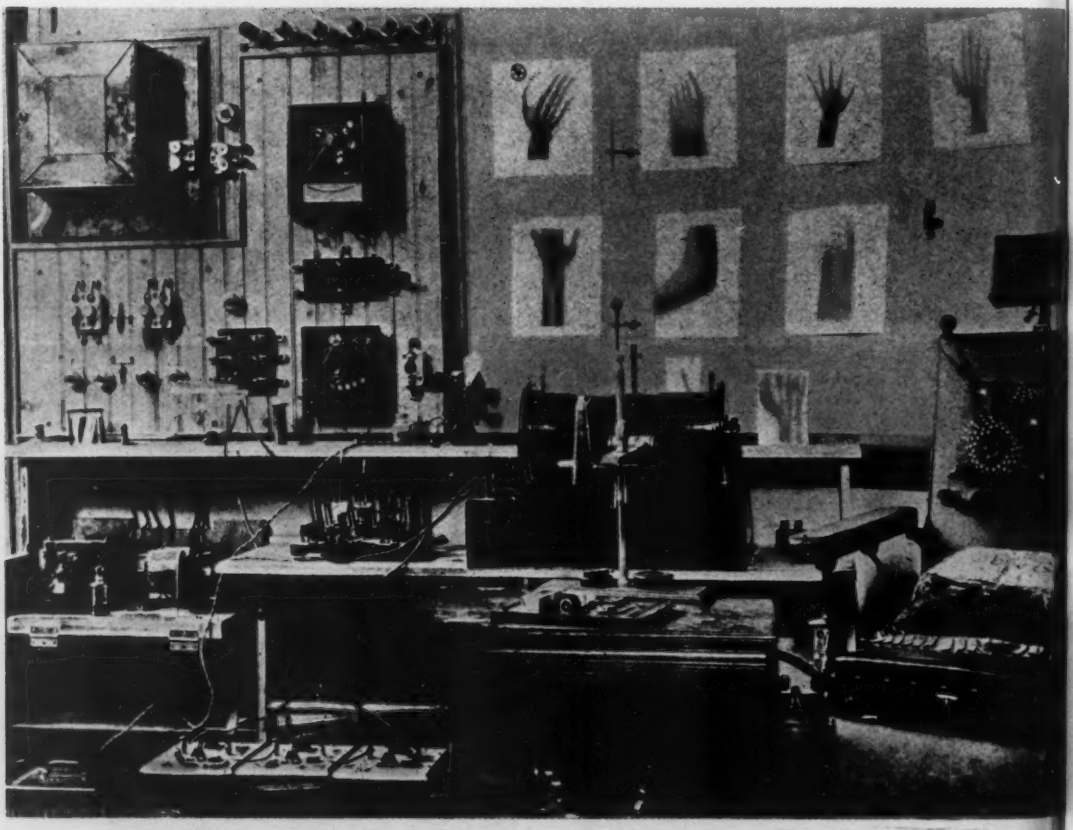
THE EDISON DAILY MATINEE AND X-RAY PERFORMANCE.
[From the New York *World*.]

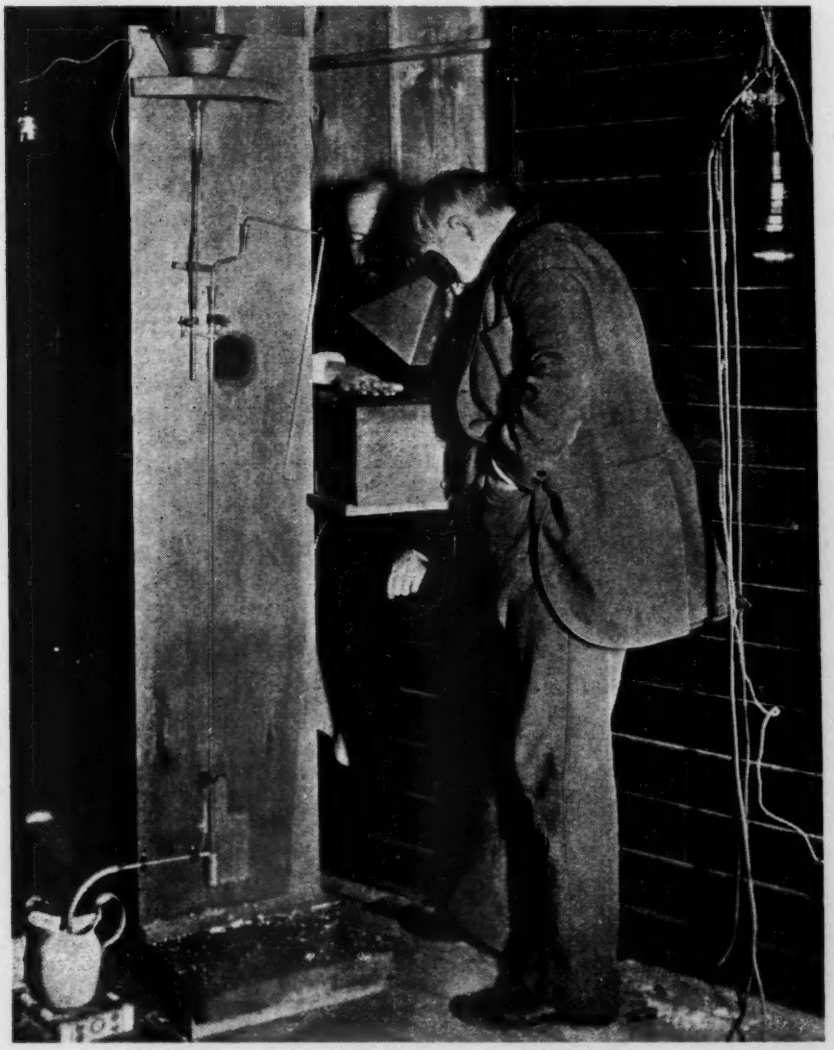
Cartoon illustrating the feverish activities of Thomas A. Edison with respect to his x-ray investigations (February 22, 1896).

Photograph made during the 1896 National Electrical Exposition in New York showing persons waiting to look at their bones with the aid of Edison's x-ray apparatus.



The outstanding contribution to shorter exposures was Professor Michael Pupin's use of an Edison fluorescent screen to augment the x-ray exposure. As a physicist at Columbia University, he experimented with x-rays from the time of their discovery. As a result of his work, the medical profession of New York City sent patients to him for x-ray pictures. In the course of his efforts to shorten the exposure time, he had a brilliant thought: Why not place the active side of a fluorescent screen next to the emulsion side of the photographic plate and then make the exposure? The combined action of visible light emitted by the screen and of the x-rays should make it possible to reduce the exposure. Thomas Edison had sent Professor Pupin several calcium tungstate fluorescent screens and he put this theory to the test when a patient presented himself with a hand "peppered" with buckshot. The patient was in extreme pain and could not hold still for a long exposure. Professor Pupin, therefore, used Edison's screen and employed an exposure of only a few seconds. The exposure effect on the photographic plate came from two sources – the x-rays and the fluorescent light from the screen. This was the first radiograph made by the





Photograph of Edison examining a hand with the fluoroscope. X-ray tube is in box and connected to a mercury pump of Edison's design (1896).

Early x-ray laboratory of Wolfram C. Fuchs of Chicago (July 1896).

above process (February 1896) and the surgical operation for the removal of the shot was the first performed in America under the guidance of an x-ray picture.

With the discovery of the x-rays, humor and indignation had a heyday. Much of the published material of the period seems rather puerile today, but presumably it was considered hilarious at the time. For example, as the demand for x-ray apparatus and supplies soon became enormous, it was quipped that "the recent increase in price of Crookes tubes and of barium platinocyanide might be termed the Röntgen raise."

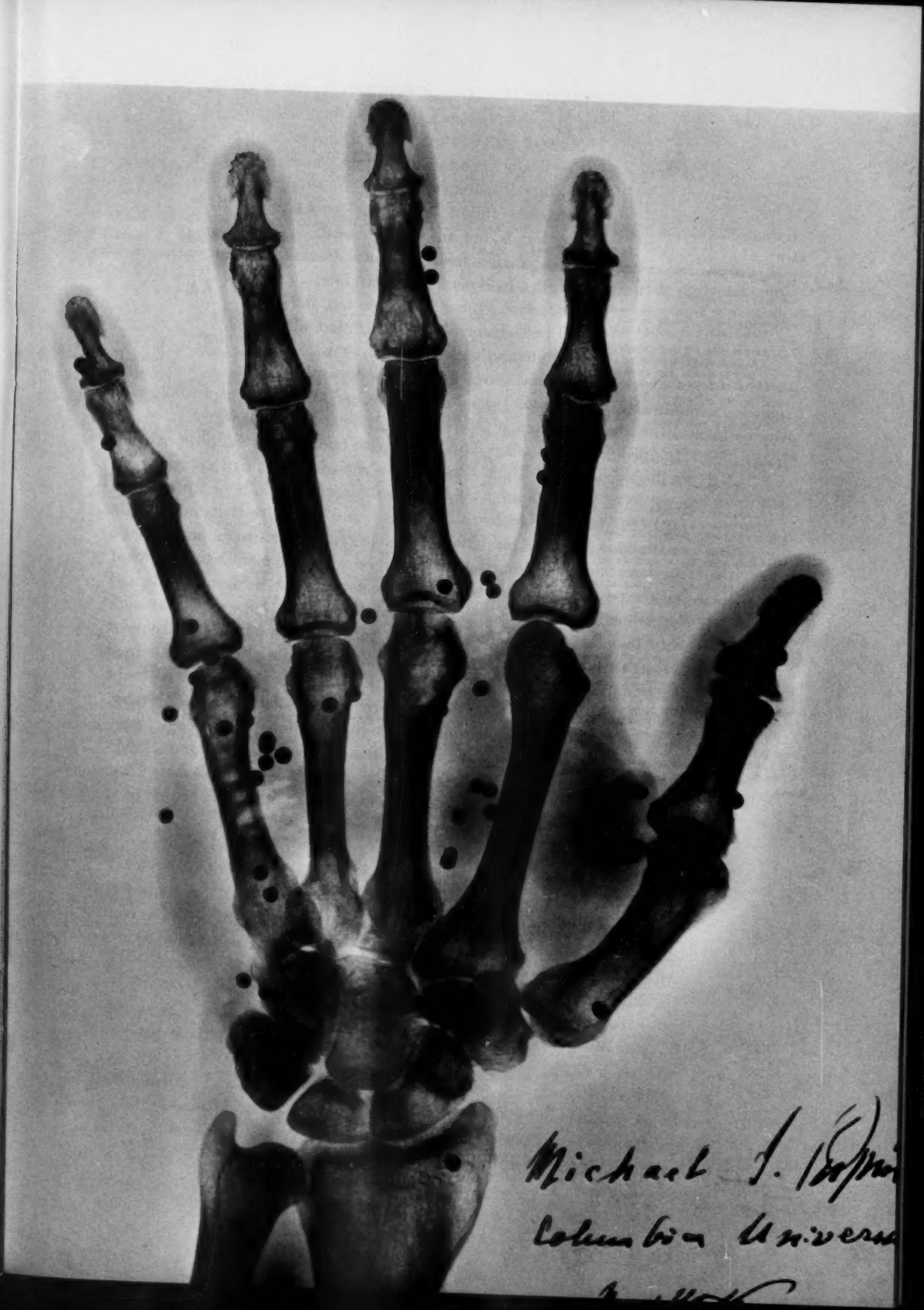
One of the earliest satirical cartoons on the subject of x-rays was concerned with the situation in which was depicted a sword-rattling Kaiser Wilhelm in the presence of John Bull. A portion of a page from *Punch* shows the cartoon and some amusing verse.

The poets were romantically inspired to describe the effect of the x-rays in verse. A typical example by Lawrence K. Russell in *Life* (March 12, 1896) follows:

These plates and a Crookes' tube have enabled scientists to show by RADIOGRAPHS the *Anatomy* of the living form, and conceded to be the greatest scientific achievement of the 19th century.

Advertisement of John Carbutt, manufacturer of the first plates in America specifically designed for x-ray work (1896).

Radiograph (positive print) made by Professor Michael Pupin employing a calcium tungstate screen and a photographic plate.


Michael I. Bo
Columbia Univers

LINES ON AN X-RAY PORTRAIT OF A LADY

She is so tall, so slender; and her bones—
Those frail phosphates, those carbinates of lime,—
Are well produced by cathode rays sublime,
By oscillations, amperes, and by ohms.
Her dorsal vertebrae are not concealed
By epidermis, but are well revealed.
Around her ribs, those beauteous twenty-four,
Her flesh a halo makes, misty in line,
Her noseless, eyeless face looks into mine,
And I but whisper, "Sweetheart, Je t'adore."
Her white and gleaming teeth at me do laugh.
Ah! lovely, cruel, sweet cathodograph!

Apparently, laymen soon began to be concerned about the use of Röntgen's rays; typical is a quotation from *Wilson's Photo. Magazine,* March 1896:

> "In one way it will be anything but a great boon. It will add unspeakably to the horrors with which the kodak is regarded. It is bad enough even now, when one is in an undesirable or ludicrous attitude or situation, to hear the 'click' of that infernal machine and to realize that the attitude or situation has been perpetuated for one's future confusion, or it may be condemnation. How much worse will it be when the merciless instrument has the power of piercing not only one's clothing but the flesh as well, and reproducing, it may be, one's mental condition. How can we tell that one's very thoughts may not be laid open to this new power which passed through all fleshy disguises as easily as light does through glass. There is something so horrible in the possibility that one is almost tempted to doubt whether the discovery is not likely to prove a curse rather than a blessing. It will certainly be necessary in the interests of humanity to restrict very materially the license enjoyed now by the owner of a 'kodak' or a 'Hawk-eye' or any other portable invader of one's privacy. — *Detroit Free Press*

During the attendant publicity concerning Edison's application of calcium tungstate screens to x-ray work, the *Pall Mall Gazette* (Brit.) of March 1896 indignantly ranted:

> "We are sick of the Röntgen rays. It is now said, we hope untruly, that Mr. Edison has discovered a substance — tungstate of calcium is its repulsive name — which is potential, whatever that means, to the said rays. The consequence of which appears to be that you can see other people's bones with the naked eye and also through eight inches of solid wood. On the revolting indecency of this there is no need to dwell. But what we seriously put before the attention of the Government is that the moment tungstate of calcium comes into anything like general use, it will call for legislative restriction of the severest kind."

Such opposition was, of course, due to lack of knowledge and understanding of x-radiation and its potentialities for usefulness. By the close of the year 1896, however, radiography was well established as an accepted recording procedure. Its enormous development into an invaluable investigative tool in medicine, the sciences, and industry is another story.

THE NEW PHOTOGRAPHIC DISCOVERY.

THANKS TO THE DISCOVERY OF PROFESSOR RÖNTGEN, THE GERMAN EMPEROR WILL NOW BE ABLE TO OBTAIN AN EXACT PHOTOGRAPH OF A "BACKBONE" OF UNSUSPECTED SIZE AND STRENGTH!

THE NEW PHOTOGRAPHY.

[Professor RÖNTGEN, of Würzburg, has discovered how to photograph through a person's body, giving a picture only of the bones.]

O, RÖNTGEN, then the news is true,
And not a trick of idle rumour,
That bids us each beware of you,
And of your grim and graveyard humour.

We do not want, like Dr. SWIFT,
To take our flesh off and to pose in
Our bones, or show each little rift
And joint for you to poke your nose in.

We only crave to contemplate
Each other's usual full-dress photo;
Your worse than "altogether" state
Of portraiture we bar *in toto!*

The fondest swain would scarcely prize
A picture of his lady's framework;
To gaze on this with yearning eyes
Would probably be voted tame work!

No, keep them for your epitaph,
These tombstone-souvenirs unpleasant;
Or go away and photograph
Mahatmas, spooks, and Mrs. B-s-NT!

The Cry of a Hungry Biped.

["On New Year's Day a number of ladies and gentlemen went to Acton, where the horses and donkeys at the Home of Rest where regaled with a dinner of carrots, bread, apples, and sugar."]

For four-legg'd beasts there 's lots of stuff,
But not for this barbarian.
Oh! would that I were ass enough,
To be a Vegetarian.

"INQUIRER" wishes to know if the warsong of the troops under the command of Dr. JAMESON is "*Jimmy on the 'shoot,' Boys!*"?

One of the first cartoons and pieces of verse appearing in the press relating to the discovery of the x-rays.

A DESCRIPTION OF THE DAGUERREOTYPE PROCESS BY DAGUERRE'S AGENT IN AMERICA

In November, 1839, there arrived from Paris a young Frenchman, Francois Gouraud, sent by Alphonse Giroux, makers of daguerreotype apparatus, to exhibit original daguerreotypes taken by Daguerre himself, to lecture on the process, and to give lessons.

After a successful stay in New York, Gouraud moved on to Boston, where he held a private view of his collection on March 6, 1840, and gave lectures at the Masonic Temple, the first of which, reported the *Daily Evening Transcript* "gave the utmost possible satisfaction to an audience of five hundred ladies and gentlemen, the number of whom would have been twice or thrice increased if the lecturer had not judiciously limited the issue of tickets, to prevent confusion and give every auditor a full opportunity to hear and see."

While he was in Boston, Gouraud published, under the little *Description of the Daguerreotype Process,* a condensation of Daguerre's manual. As an appendix, he reprinted from the *Boston Patriot and Daily Advertiser* for March 26, 1840, an account of how to make portraits – an application of photography then in its infancy. By kind consent of the Boston Athenaeum, we reprint herewith in facsimile this rare, sixteen-page pamphlet, the earliest publication in America on photography.

DESCRIPTION

OF THE

DAGUERREOTYPE PROCESS,

OR

A SUMMARY

OF

M. GOURAUD'S PUBLIC LECTURES,

ACCORDING TO THE PRINCIPLES OF

M. DAGUERRE.

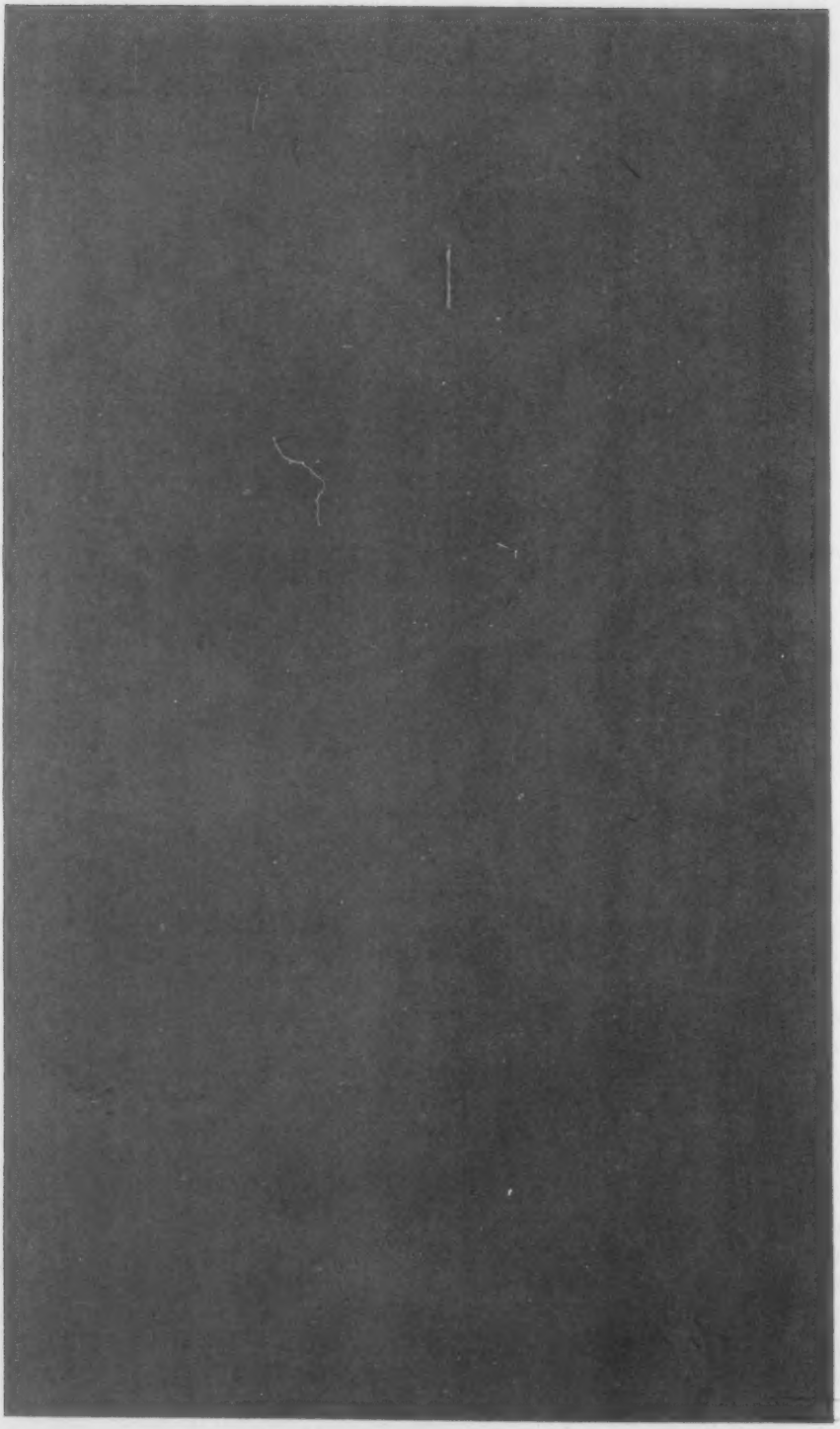
WITH A

DESCRIPTION OF A PROVISORY METHOD FOR TAKING

HUMAN PORTRAITS.

BOSTON:
DUTTON AND WENTWORTH'S PRINT.

1840.



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PRELIMINARIES.

Contents.

Description of the Daguerreotype apparatus—Practicial description of the process. Five steps of it explained—polishing the plates—preparing the plates with a coating of Iodine—the camera obscura—mercurial process—washing the designs, &c.

THE APPARATUS.

A Daguerreotype Apparatus must be composed of the following objects:—the camera obscura, with its lens—the Iodine box, with its wooden dish—the substance box—mercury box, with its grooved board—a moveable camera sash, with its plate board—the plate box—the travelling box—two rinsing pans—a washing pan, with a cork at the corner—a phial containing olive oil—some very finely carded cotton—some impalpable pumice powder, tripoli, or other polishing substance, tied up in a bag of muslin, sufficiently thin to allow the powder to pass through when the bag is shaken—a phial of nitric acid, at 40 degrees, diluted with water, in the proportion of one liquor glass to sixteen of the same of distilled water—a small furnace—one spirit lamp—a phial of mercury—four metallic bands or cramps, the same substance as the plate—six wooden wedges—one glass funnel—a phial of Iodine—a bottle of hyposulphate of soda—a tea kettle—a vessel for distilled water—a little box of nails—a pair of iron pincers—a candlestick—chemical matches.

NOTICE:—*Each part of the apparatus afforded by M. F. Gouraud, bears an indication of its application; and as* PERFECTION AND CLEARNESS *in the* DESIGN *depend only on the* MATHEMATICAL EXACTNESS *of the apparatus, as in the extreme* PURITY *of the chemical substances employed in the process, each apparatus* PREVIOUSLY EXAMINED *and* TRIED *by M. Gouraud, bears his signature and seal as a guarantee of its perfection.*

PREAMBLE.

I.

The Daguerreotype, designs are executed upon thin plates of silver, plated on copper. The silver must be the purest that can be procured. As to the copper, its thickness ought to be the 24th number of the wire gage of brass manufacturers, and the proportion of silver, that must cover its surface, the 20th of it in weight. If the plates were not *faithfully* prepared by the manufacturers, according to the principle requisite for the Daguerreotype process, it is impossible to hope for any good success.

II.

The photogenic process is divided into five operations.

1. The first consists in polishing and cleaning the plate, in order to prepare it for receiving the sensitive coating, upon which the light traces the design.

2. The second is to apply this coating.

3. The third is the placing the prepared plate properly in the camera obscura, to the action of light, for the purpose of receiving the image of nature.

4. The fourth brings out this image, which at first is not visible on the plate being withdrawn from the camera obscura.

5. The fifth and last operation has for its object to remove the sensitive coating on which the design is first impressed, because this coating would continue to be affected by the rays of light, a property which would necessarily and quickly destroy the picture.

FIRST OPERATION.

Preparing the Plate.

The requisites for this operation are :
The phial containing olive oil.
Some of the finely carded cotton.
A small quantity of the polishing powder.
The phial of diluted nitric acid.
The furnace with charcoal.
A dozen at least of ordinary sheets of paper.

As already stated, these photographic delineations are executed upon silver plated on copper. The size of the plate will depend, of course, on the dimensions of the camera. We must begin by polishing it carefully. To accomplish this, the surface of the silver is powdered all over with the polishing substance, by shaking the bag without touching the plate.

Next, with some cotton dipped in a little olive oil, the operator rubs the plate gently, rounding his strokes, all over its surface. During this operation, the plate must be laid flat upon several folds of paper, care being taken to renew these from time to time, that the tablet be not twisted from any inequality in the support.

The polishing substance must be renewed and the cotton changed several times. It will be readily apprehended of what importance it is to attend to these directions, since upon the high polish of the silver depends in a great measure the beauty of the future design. When the plate is well polished, it must next be cleaned by powdering it all over once more with pumice, and rubbing with dry cotton, always rounding and crossing the strokes, for it is impossible to obtain a good surface by any other motion of the hand. A little pledget of cotton is now rolled up and moistened with the diluted acid already mentioned, by applying the cotton to the mouth of the phial and inverting it, pressing gently, so that the centre only of the cotton may be wetted and but slightly, care being taken not to allow any acid to touch the fingers. The surface of the plate is now rubbed *equally* all over with the acid applied by the pledget of cotton. Change the cotton and keep rubbing, rounding as before, that the acid may be equally spread, yet in so small a quantity as just to skim the surface, so to speak. If, as frequently happens, the acid run into small drops from the high polish, change the cotton repeatedly and break down the globules as quickly as possible,

but always by gently rubbing, for if allowed to rest or to run upon the plate, they will leave stains. It will be seen when the acid has been properly diffused, from the appearance of a thin veil spread regularly over the whole surface of the plate. Once more powder over pumice, and clean it with fresh cotton, rubbing as before, but very slightly.

The plate is now to be subjected to a strong heat. It is placed upon the furnace, the silver upwards, during at least five minutes, the operator holding it with a pair of long and strong pincers, and moving it at the same time, till all is equally heated. The plate is then to be cooled *suddenly*, by placing it on a cold substance, such as a mass of metal or stone, or best of all, a marble table. When perfectly cold, it is to be again polished, an operation speedily performed, since its gummy appearance merely has to be removed, which is done by the dry pumice and cotton repeated several times, changing the cotton frequently. The polishing being thus completed, the operation of the acid is to be repeated three different times, dry pumice being powdered over the plate each time, and polished off very gently with the cotton, which must be very clean, care being taken not to breathe upon the plate or to touch it with the fingers, or even with the cotton upon which the fingers have rested, for the slightest stain upon the surface will be a defect in the drawing.

When the plate is not intended for immediate use, the last operation of the acid is not performed. This allows any number of plates to be kept prepared up to the last slight operation, and they may be purchased in this state if required. It is, however, indispensable that a last operation by acid as described, be performed on every plate, immediately before it be placed in the camera. Lastly, every particle of dust is removed by gently cleaning the whole edges and back also with cotton, or by simply moving the plate in the air.

SECOND OPERATION.

Coating the Plate.

For this operation we require :
The iodine box.
The small board of the camera sash.
The small metallic bands.
The phial of iodine.

The plate is first to be fixed upon the board by means of the metallic bands with their small catches and tacks. The idione is now put into the little wooden dish of the iodine box. It is necessary to divide the iodine into pieces, in order to render the exhalation the more extensively and more equally diffused, otherwise it would form circles in the centre of the plate, which would destroy this essential requisite. The board is now fitted into its position, the plate face downwards, the whole being supported by small brackets projecting from the four corners of the box, which is then closed. In this position the apparatus remains till the vaporization of the idione which is condensed upon the plate, has covered its surface with a fine coating of a yellow gold colour. If this operation be protracted, the gold colour passes into violet, which must be avoided, because in this state the coating is not so sensitive to the impressions of light. On the contrary, if the coating be too pale, the image of nature in the camera will be too faint to produce a good picture. A decided *gold colour*—nothing more—nothing less—is the only assurance that the ground of the future picture is duly prepared. The time for this cannot be determined, because it depends upon several circumstances. Of these the two principal are the temperature of the apartment, and the state of the apparatus. The operation should be left entirely to spontaneous evaporation of the iodine—or at all events, no other heat should be used than what can be applied through the temperature of the room in which the operation takes place. It is also very important that the temperature of the inside of the box be equal to that of the air outside, for otherwise, a deposition of moisture takes place upon the plate, a circumstance most injurious to the final result. Secondly, as respects the state of the apparatus; the oftener it has been used, the less time is required, because in this case, the interior of the box being penetrated with the vapours of iodine, these arise from all sides, condensing thus more equally and more rapidly upon the surface of the plate, a very important advantage. Hence it is of consequence to leave always a small quantity of iodine in the cup, and to protect this latter from damp. Hence, likewise, it is obvious that an apparatus of this kind which has been some time in use, is preferable to a new box, for in the former the operation is always more expeditiously performed.

Since from these causes the time cannot be fixed, *a priori*, and may vary from five minutes to half an hour, rarely more, unless the weather be too cold, means must be adopted for examining the plate from

time to time. In these examinations it is important not to allow the light to fall directly upon the plate. Also, if it appear that the colour is deeper on one side of the plate than the other, to equalize the coating the board must be replaced, not exactly in its former position, but turned one quarter round at each inspection. In order to accomplish these repeated examinations without injuring the sensibility of the ground or coating, the process must be conducted in a darkened apartment into which the light is admitted side-ways, never from the roof—the door left a little ajar answers best. When the operator would inspect the plate, he raises the lid of the box, and lifting the board with both hands, turns up the plate quickly, and very little light suffices to shew him the true colour of the coating. If too pale, the plate must be instantly replaced, till it attains the proper gold tone; but if this tint be passed, the coating is useless, and the operations must be repeated from the commencement of the first.

From description this operation may perhaps seem difficult, but with a little practice one comes to know pretty nearly the precise interval necessary to produce the true tone of colour, and also to inspect the plate with great rapidity, so as not to allow time for the light to act.

When the coating has reached the proper tone of yellow, the plate with the board to which it is fixed, is slipped into the camera sash, and thus adjusted at once in the camera obscura. In this transference care must be taken to protect the plate from the light; a taper should be used, and even with this precaution, the operation ought to be performed as quickly as possible, for a taper will leave traces of its action if continued for any length of time.

We pass now to the third operation, that of the camera. If possible the one should *immediately* succeed the other, the longest interval between the second and third ought not to exceed an hour. Beyond this space the action of the iodine and silver no longer possesses the requisite photogenic properties.

Observanda.—Before making use of the box, the operator should clean it thoroughly, turning it bottom upwards, in order to empty it of all the particles of iodine which may have escaped from the cup, avoiding at the same time touching the iodine with the fingers. During the operation of coating, the cup ought to be covered with a piece of gauze stretched on a ring. The gauze regulates the evaporation of the iodine, and also prevents the compression of the air on the lid being shut from scattering the particles of iodine, some of which reaching the

plate, would leave large stains on the coating. For the same reason the top should always be let down with the greatest gentleness, not to raise the dust in the inside, the particles of which being charged with the vapour of the iodine, would certainly reach and damage the plate.

THIRD OPERATION.

The Camera.

The apparatus required in this operation, is limited to the camera obscura.

This third operation is that in which by means of light, acting through the camera, nature impresses *an image of herself* on the photographic plate, enlightened by the sun, for then the operation is more speedy. It is easy to conceive that this operation, being accomplished only through the agency of light, will be the more rapid in proportion as the objects, whose photographic images are to be delineated, stand exposed to a strong illumination, or in their own nature present bright lines and surfaces.

After having placed the camera in front of the landscape, or facing any other object of which it may be desirable to obtain a representation, the first essential is a perfect adjustment of the focus, that is to say, making your arrangements so as to obtain the outlines of the subject with great neatness. This is accomplished by advancing or withdrawing the frame of the obscured glass which receives the images of natural objects. The adjustment being made with satisfactory precision, the moveable part of the camera is fixed by the proper means, and the obscured glass being withdrawn, its place is supplied by the apparatus, with the plate attached as already described, and the whole secured by small brass screws. The light is of course all this time excluded by the inner doors; these are now opened by means of the two brass semicircles adapted to them, and the plate is disposed ready to receive its proper impressions. It remains only to open the aperture of the camera, and to consult a watch.

This latter is a task of some nicety, because as nothing is visible, and as it is quite impossible to determine the time necessary for producing a design, this depending entirely on the intensity of the light on the objects, the imagery of which is to be reproduced. At Boston, for example, this varies from three to thirty minutes.

It is likewise to be remarked, that the seasons, as well as the hour of the day, exert considerable influence on the celerity of the operation. The most favorable time is from seven to three o'clock; and a drawing which, in the months of June and July at Boston, may be taken in three or four minutes, will require five or six in May or August, seven or eight in April and September, and so on in proportion to the progress of the season. These are only general data for very bright or strongly illuminated objects, for it often happens that twenty minutes are necessary in the most favorable months, when the objects are entirely in shadow.

After what has just been said, it will readily occur to the reader that it is impossible to specify with precision the exact length of time necessary to obtain photographic designs; practice is the only sure guide, and with this advantage, one soon comes to appreciate the required time very correctly. The latitude is of course a fixed element in this calculation. In the south of America, for example, and generally in all those countries in which light has great intensity, as Spain, Italy, &c., we can easily understand that these designs must be obtained with greater promptitude than in more northern regions. It is, however, very important not to exceed the time necessary, in different circumstances, for producing a design, because, in that case, the lights in the drawing will not be clear, but will be blackened by a too-prolonged solorization. If, on the contrary, the time has been too short, the sketch will be very vague, and without the proper details.

Supposing that he has failed in a first trial, by withdrawing the tablet too soon, or by leaving it too long exposed, the operator in either case, should commence with another plate immediately; the second trial, being corrected by the first, almost insures success. It is even useful, in order to acquire experience, to make some essays of this kind.

In this stage of the process, it is the same as for the coating; we must hasten to the next operation. When the plate is withdrawn from the camera, it should immediately be subjected to the subsequent process; there ought, at most, not to be a longer interval than an hour between the third and fourth operations; but one is always surest of disengaging the images when no space has been allowed to intervene.

FOURTH OPERATION.

Mercurial or Disengaging Process.

Here are required:

The phial of mercury, containing at least 16 oz.

The lamp with spirit of wine.

And the mercury box with its grooved flat board.

With a great deal of care the mercury is poured into the cast iron cup at the bottom of the box: the quantity must be sufficient to cover the *bulb* of the thermometer; afterwards, and throughout the remaining operations, no lights, save a taper, can be used.

The board, with the plate affixed, is now to be withdrawn from the mobile camera sash, and placed rapidly on the grooved board of the mercury box. Immediately, when this is done, the board is then placed within the ledges of the mercury box, at an angle of 45°, the tablet with sketch downwards, so that it can be seen through the semicircular glass of the upper part; the top of the box is then gently put down, so as not to rise particles of the mercury, and the front glass previously carefully covered up with a piece of any kind of a dark cloth.

When all things are thus disposed, the spirit lamp is lighted, and placed under the cup containing mercury. The operation of the lamp is allowed to continue till the thermometer, the bulb of which is covered by the mercury, indicates a temperature of 65° centigrade (140° F.) The lamp is then immediately withdrawn; if the thermometer has risen rapidly, it will continue to rise without the aid of the lamp, but this elevation ought not to exceed 75° centigrade (167° F.)

The impress of the image of Nature exists upon the plate, but it is invisible. It is not till after the lapse of several minutes that the faint tracery of objects begins to appear, of which the operator assures himself by looking through the glass, by the light of a taper, using it cautiously that its rays may not fall upon, and injure the nascent images of the sketch. The operation is continued till the thermometer sink to 45° centigrade (113° F.); the plate is then withdrawn, and this operation completed.

When the objects have been strongly illuminated, or when the action in the camera has been continued rather too long, it happens that this fourth operation is completed before the thermometer has fallen even to 65° centigrade (131° F.) One may always know this, however, by observing the sketch through the glass of the mercury box.

It is necessary after each operation to clean the inside of the apparatus carefully, to remove the slight coating of mercury adhering to it. When the apparatus has to be packed for the purpose of removal, the mercury is withdrawn by the small brass cock, inclining the vessel to that side.

One may now examine the sketch by a *feeble light*, in order to be certain that the processes hitherto have succeeded. The plate is now detached from the board, and the little bands of metal which held it there are carefully cleaned with pumice and water after each experiment, a precaution rendered necessary from the coating both of iodine and mercury which they have acquired. The plate is now deposited in the grooved plate box, until it undergoes the fifth and last operation. This may be deferred if not convenient; for the sketch may now be kept for months in its present state without alteration, provided it be not too frequently inspected by the full daylight.

FIFTH OPERATION.

Fixing the Impression.

The object of this final process is to remove from the tablet the coating of iodine, which continuing to decompose by light would otherwise speedily destroy the design when too long exposed. For this operation the requisites are—

A saturated solution of common salt, or a weak solution of pure hyposulphite of soda—one measure whatever of *crystalized* hyposulphite, upon 14 of the same measure of distilled water.

The tin washing pans.

The vessel of distilled water.

In order to remove the coating of iodine, when the operator could not afford hyposulphite of soda, common salt is put into a bottle with a wide mouth, which is filled one fourth with salt and three-fourths with pure water. To dissolve the salt, shake the bottle, and when the whole forms a saturated solution, filter through paper. This solution is prepared in large quantities before-hand, and kept in corked bottles.

Into one of the square troughs pour the solution, filling it to the height of an inch; into the other, pour in like manner your water. The solution of hyposulphite of soda, must be always preferred, than that of common salt, when possible, because it removes the iodine entirely,

which the saline solution does not always accomplish, especially when the sketches have been laid aside for some time between the fourth and fifth operations. It does not require to be warmed, and a less quantity is required.

First, the plate is placed in common water, poured into a trough, plunging and withdrawing it immediately—the surface merely requiring to be moistened—then plunge it into the saline solution, which latter would act upon the drawing, if not previously hardened by the washing in pure water. To assist the effect of the saline solutions, the plate is moved about in them by means of a little hoop of copper wire, or with the finger. When the yellow color has quite disappeared, the plate is lifted up with both hands, care being taken not to touch the drawing, and plunged again into the first trough of pure water.

Now, when the plate has been a moment into that water, the same washing pan is placed in an *inclined* position, sustained behind by any elevated thing, the *corked* corner being in the lower center point; the cock is then taken out, and then distilled water, hot, but not boiling, is made to flow in a stream over its whole surface, carrying away every remaining portion of the saline wash.*

Not less than a quart of distilled water is required when the design is of the now usual dimensions: 8½ by 6½ inches. The drops of water remaining on the plate must be removed by forcibly blowing upon it, for otherwise in drying they would leave stains on the drawing. Hence also will appear the necessity of using very pure water, for if in this last washing, the liquid contain any admixture of foreign substances, they will be deposited on the plate, leaving behind numerous and permanent stains. To be assured of the purity of the water, let a drop fall upon a piece of polished metal; evaporate by heat, and if no stain be left the water is pure. Distilled water is always sufficiently pure without this trial.

After this washing the drawing is finished, it remains only to preserve it from the dust, and from the vapors that might tarnish the silver. The mercury, by the action of which the images are rendered visible, is partially decomposed; it resists washing, by adhesion to the silver, but cannot endure the slightest rubbing.

To preserve these sketches then, place them in squares of strong pasteboard, with a glass over them, and frame the whole in wood. They are thenceforth unalterable even by the sun's light.

* If hyposulphite has been used, the distilled water need not be so hot as when common salt has been employed.

In travelling, the collector may preserve his sketches in a box similar to the one belonging to the apparatus, and for greater security may close the joints of the lid * with a collar of paper. It is necessary to state, that the same plate may be employed for several successive trials, provided the silver be not polished through to the copper. But it is very important after each trial to remove the mercury immediately by using the pumice powder with oil, and changing the cotton frequently during the operation. If this be neglected, the mercury finally adheres to the silver, and fine drawings cannot be obtained if this amalgam be present. They always in this case want firmness, neatness, and vigor of outline and general effect.

* Mr. Daguerre made attempts to preserve his sketches by means of different varnishes obtained from succinum, copal, Indian rubber, wax, and various resins; but he has observed, that by the application of any varnish whatsoever, the lights in these sketches were considerably weakened, and at the same time the deeper tones were hidden. To this disadvantage, was added the still greater injury from the decomposition of the mercury by all the varnishes tried; this effect, which did not become apparent till after the lapse of two or three months, terminated in a total destruction of the forms of the objects represented. Even had this not been the case, the author would have deemed it a sufficient reason for rejecting all varnishes, that they injured the vigor and clearness of the lights. The quality most to be desired in the new art is this intensity of tone in the contrast of the lights and shadows.

MANNER OF TAKING PORTRAITS

BY THE DAGUERREOTYPE,

Such as published in the Boston Daily Advertiser and Patriot, of March 26th, 1840.

Short Historical Introduction.

Within fifteen days after the publication of the process of M. Daguerre, in Paris, people in every quarter were making portraits. At first they were all made with *the eyes shut.* M. Susse, of the *place de la Bourse*, was one of the first amateurs who succeeded in making them in the most satisfactory manner. The achromatic lens, recommended by M. Daguerre was naturally first made use of. But these amateurs soon perceived, that in using a glass of this kind, a very long time was required to make the drawing. Every one began to look about for some means of shortening, as much as possible, the period of from fifteen to twenty-five minutes, which M. Susse, who had the whole disposal of his time, had employed in making his pretty portraits—with the eyes shut. Almost at the same time a young man, in the employment of the Minister of Public instruction, Mr. Abel Rendu, directed by the most simple optical principles, adopted an idea which seemed new to him, and produced to the admiration of some of the Paris circles, portraits of men and women, with the *eyes open*, executed in the most satisfactory manner. The mathematical perfection in the representation of the eyes, which M. Daguerre had been seeking for so long a time, was, to be sure, not to be found in these portraits; but this difference was so minute, that it was scarcely perceptible at first sight even by the most practised eye. On expressing the astonishment with which I was struck, and giving the warmest compliments of encouragement to M. Abel Rendu, that gentleman, without seeking to make the slightest mystery of the means he had employed, told me immediately that he had obtained these first results by means of a *Meniscus!* I immediately made a trial of this method. I used at first the Meniscus recommended by Wollaston, then the common one with one side plain, then one with a parabolic concavity, and obtained also the most satisfactory results, thanks to the information communicated in a manner so obliging by M. Abel Rendu. As these experiments were made just on the eve of my departure, it was impossible for me to repeat them, and not being able to resist the request of the person, in whose portrait I had succeeded in making the very best of my attempts, I left this most successful specimen behind with him, intending to supply myself with specimens at New York or elsewhere, when the fine summer sun should return, to offer us his brilliant light, so essential to the rapid execution of this operation. The portraits I had made in Paris, as well as those obtained by Mr. Abel Rendu, were formed in from ONE *minute to* TWO *minutes twenty-seven seconds*, at the

farthest. Considering the foggy atmosphere of Paris, this was already an immense step, but as M. Rendu did not attach any great importance to a discovery which did not offer the positively mathematical perfection which M. Daguerre required, and which M. Daguerre had undoubtedly himself, already disdained, he did not wish to make the thing an affair of *reputation*, but authorized me to make any use of it in America which I pleased. Before I quitted Paris, I made use of his Meniscus to take the pretty view of the *Pont Louis Phillippe*, and the magnificent *facade des Tuilleries*, which are found in my collection. From the slightly nebulous sides of these two pictures, in contrast with the clearness of the centre, may be seen at a glance the adaptation of the *Meniscus*, in preference to the other kinds of glasses, as regards the art of making portraits with the Daguerreotype. It will be perceived, that the centre of the design, offers in sharpness, in the lines, and in general clearness, a vigor in inverse proportion to the nebulosity of the sides. The reason why the Meniscus should give more clear lines, and act in a shorter space of time on the iodine plate in the camera obscura, will be obvious to all persons acquainted with the most simple principles of optics.

What is important, then, to the amateur in Daguerreotype drawing to know, is the manner of making use of it. The following is the process, (with the exception of some minute details, which it would be impossible to give in the columns of a newspaper,) as I communicated it on my arrival at New York to all who wished to hear it, and in fact as I have described it, (even to its details) in my crowded public lectures. I render it thus public, by means of the press, in order that those who may not have the opportunity of hearing my verbal information on the subject, may make experiments for themselves, and in fine, that by the means already made use of, they may know that I am able to make the *portrait of any person who wishes it.*

The shortness of the description will be equal to the simplicity of the method, and I am desirous that this new proof of my efforts to please the enlightened community in the midst of which I am placed, and by which I every day continue to be so kindly patronized—I desire, I say, in offering something of actual utility, as well as a source of intellectual amusement, that this new proof of my efforts, small as it may be in value of itself, may nevertheless be acceptable to all. Reserving for my public lectures a description of the general process, in obtaining drawings by the beautiful method of M. Daguerre, I will describe, in a few words, for the benefit of those who have already a notion of that process, how it is possible at the present time, to obtain a miniature portrait by the Daguerreotype.

SUMMARY DESCRIPTION OF THE PROCESS.

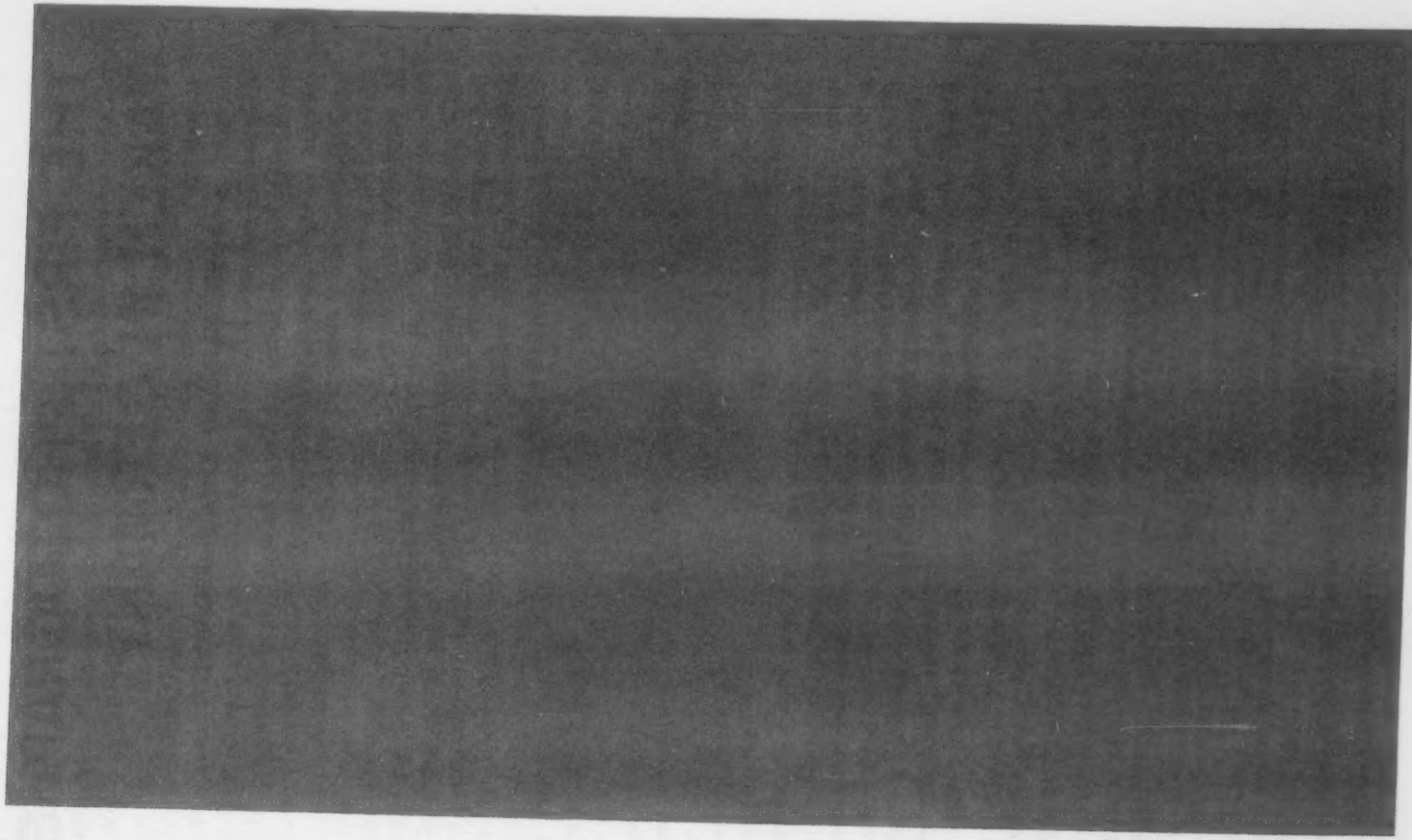
In the first place you will begin by preparing a room exposed to the sun, the south-east if possible. You will give to this room the form of a truncated pyramid, lying down, of which the base will be the whole breadth of the window—which window you will make as large as possible, and ex-

tending from the floor to the ceiling. The floor, the ceiling, and the two sides of the room, should be plastered with the whitest kind of lime plaster Those who cannot dispose a room in this manner, can fix the sides of the room with sheets or other cloth of perfect whitness. The focus of the room must be covered with a tapestry of white cotton, with knotted or raised figures, which is designed to form the drapery. These are always agreeable to the eye, and should always be shewn in interior views. The chair on which the person sits must be of yellow wood. The person, if a man, must be dressed in a clear grey coat, pantaloons of a little deeper hue, a vest of a fancy ground, yellow, orange, if possible, with figures of a color to make a contrast, the whiteness of the shirt contrasting with a cravat of a grey ground, either a little less dark or more deep than the coat. The toilet of a lady should be of the same shades, and in all cases black must be constantly avoided, as well as green and red. This arrangement, however, is pointed out as the best means of obtaining the best effect; for, as in a portrait, the face is what is most cared for, the costume can be studied more or less at will, but the portrait, with other arrangements, will not be so agreeable to the eye. By means of mirrors properly disposed at the window or in the room, you will concentrate the strongest possible light on the person, and will considerably augment that of the chamber, which has already been made as clear as possible. If the sun should be too brilliant, and the *patient* is not able comfortably to bear the reflection of it, use may be made of the blue glass, recommended by M. Daguerre.

Having covered your plate well with the coating of iodine, you will fix the sitter. His head should be placed on a semi-circle of iron, fitted to the back of the chair. His arms may be arranged at pleasure. He should fix his eyes on some well defined object in any direction which he may prefer—the focus of the camera obscura must be regulated and provided with a good Meniscus. Now, if every thing has been arranged as it should be, your portrait will often be made, even in less than *twenty seconds*, and in the most satisfactory manner.

This is, *at present*, the most approved method of making a miniature by the Daguerreotype. Others may perhaps pretend to improve or invent, after my explanations have been made, because while employing the same means, they will change their places, or call them by other names. But until other methods shall have better success, it is certainly right that those who attach any importance to a futile celebrity should render to Cæsar the things which are Cæsar's, and it is right that the method of M. Abel Rendu, *rendered* public by me in this country, should be attributed entirely to him.

I will now say, at the close, that by adopting a confidential communication which I have received from M. D. G., the French Professor at Cambridge, since I arrived in Boston, I think it is very probable that we shall succeed in obtaining a Daguerreotype portrait in much less time than by the process above described. F. G.



THE FIRST PHOTOGRAPHS TAKEN IN GERMANY

by HELMUT AND ALISON GERNSHEIM

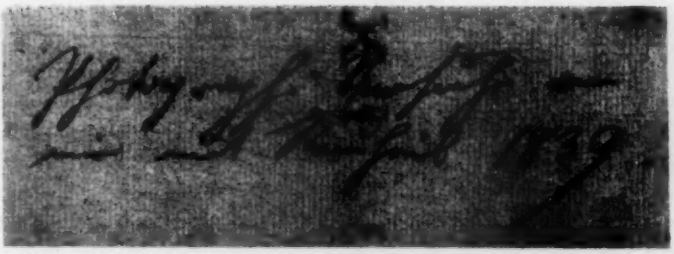
In our *History of Photography* published in 1955 we briefly mentioned the pioneer photographic work of two Munich scientists, Carl August von Steinheil and Franz von Kobell. We refrained from dating it, for frankly we distrusted Dr. Rudolf Loher's unsupported claim[1], copied by Prof. Erich Stenger[2], dating Steinheil's photographs 1837, and limited ourselves to saying that Steinheil and Kobell "succeeded some time before January 1839 in fixing the images of the *camera obscura* on paper coated with chloride of silver." J. M. Eder's reference[3] to a publication by Kobell of his joint experiments with Steinheil in a Munich newspaper on 1 February 1839 (not mentioned by Loher or Stenger) seemed to us sufficient justification for considering them "independent inventors of photography" for Talbot's memoir *Some account of the art of Photogenic Drawing* was read in London only the day before, so not the slightest connection was possible.

Wondering why Prof. Stenger, a Trustee of the Deutsches Museum in Munich, should have failed to reproduce a single one of the supposed 1837 Steinheil photographs preserved there – we might even say, throw away such a golden opportunity to claim a share in the invention of photography for Germany – we wrote to the Deutsches Museum, only to learn that the photographs were still packed up in cases, awaiting the reconstruction of the damaged building. At length, in October 1957, the Museum consented to reproduce for us the most interesting of the Steinheil/Kobell photographs, and one of their cameras, although all the objects belonging to their Photographic Department were, and still are, in storage. With their permission we are now able to publish these photographs here for the first time. As we suspected, none of them date from 1837. On the contrary, a note in Kobell's hand in the album containing them states: "Photogr. Versuche von mir mit Steinheil 1839" ("Photogr. experiments by me with Steinheil 1839").

1. Dr. Rudolf Loher, *Carl August von Steinheil, der Erfinder und Schöpfer der Kleinbild-Photographie vor 100 Jahren.* Munich, n.d. (1937). As this brochure is probably not available in America we give the gist of Loher's statement. Steinheil went to Paris in spring 1837, met Francois Arago, from whom he obtained "the recipe for making light-sensitive silver salts. One is therefore by no means astonished to hear that Steinheil, still in the same year 1837, fixed his first light pictures on paper. The originals are at the Deutsches Museum in Munich in the Photographic Section." Dr. Loher was apparently unaware that the use of paper coated with silver salts for measuring the intensity of light sources and for studying the solar spectrum had been quite general by astronomers and physicists since about 1780. These photometers, of course, had nothing whatsoever to do with making pictures.
2. Prof. Erich Stenger, *Die Photographie in München 1839-1860,* Berlin, 1939; also in *Siegeszug der Photographie,* Seebruck, 1950, p. 112.
3. Prof. J. M. Eder, *History of Photography* translated by Edward Epstean, New York, 1945, p. 286.

Since the evidence was so easily establishable, the only mystery that remained was how Dr. Loher and Prof. Stenger could ever have arrived at such an unwarranted claim. The matter obviously called for an examination of contemporary Munich publications to establish whether Steinheil ever claimed to have taken photographs in 1837, and we give below the result of our recent researches.

In March 1839 Steinheil and Kobell, who were both members of the Bavarian Royal Academy of Sciences, combined in photographic experiments on paper. The direct cause of their labours in photography was a letter from Talbot to the Academy, with which he sent them his paper *Some account of the art of Photogenic Drawing* as printed in the *Athenaeum* of 9 February. At a meeting of the Academy on 9 March, receipt of Talbot's article in the *Athenaeum* was acknowledged, and Steinheil declared that he would make a report on the subject. It was read to the mathematical-physical section of the Academy on 13 April, but it was decided not to print Talbot's communication because it did not disclose his method. (This proves that Talbot had sent them only his first paper, and not *An account of the*



Autograph note by Franz von Kobell.

processes employed in Photogenic Drawing which was read to the Royal Society, London, on 21 February and printed in the *Athenaeum* two days later.) At this same meeting on 13 April, Kobell and Steinheil submitted the results of their own joint experiments[4], from which four important facts emerge.

(1) Kobell and Steinheil do not refer to any photographic experiments ever tried by either of them before March 1839. It is inconceivable that Steinheil would not have mentioned his (supposed) photographs in 1837.
(2) Their photograph of the Frauentürme (cathedral towers) which Stenger cites as having been taken in 1837 was amongst the specimens submitted with their report, and was taken in March or early April 1839.
(3) Their process, though very similar to Talbot's, was apparently worked out independently, although Talbot's second paper giving his methods must have been available in Munich before 13 April.
(4) In the experiments Steinheil was responsible for the construction of the camera, whilst Kobell attended to the chemical side, that is to say, he was really the photographic inventor.

4. Published in *Gelehrte Anzeigen der königlichen bayerischen Akademie der Wissenschaften*. 3 July 1839.

Kobell reported that they used fine sized English drawing paper, soaked in a solution of cooking salt (sodium chloride) and water in the proportion 1:15. When nearly dry, the paper was (in the dark) drawn across a shallow dish containing nitrate of silver solution made with 1 part of nitrate of silver and 3 parts of water. The paper was then dried, and the performance repeated two or three times.

With this sensitive silver chloride paper engravings could be copied in the sun by superposition in about 5 minutes. As regards camera pictures, "if these are not to be too small, they need an exposure of several hours, according to the intensity of the sunlight." Like Talbot, they found that the paper was more sensitive when damp, and to keep it flat in the camera, it was put between two sheets of mica.

Fixing was done either with caustic ammonia, when the colour was "a beautiful warm dark brown," or preferably with potassium hyposulphite, which gave the picture a deep violet or even grayish-black tone. The resulting pictures were negatives. The paper was apparently too opaque to print from, for Kobell mentions that in order to get the light and shade in the right place they were re-photographed. He considered, however, the second pictures (i.e. positives) less good, lacking in contrast, and all the photographs still extant – and hence the illustrations in this article – are negatives.

Steinheil, writing about the optical problems involved in photography, mentions the advisability of using an achromatic lens with a large opening in relation to the focal length, i.e. 2 to 5, but adds that one may have to reduce the aperture to gain sharpness, when the exposure will be longer.

The cylindrical camera designed by Steinheil for the experiments foreshadowed in form Voigtländer's and Thomas Davidson's metal cameras constructed for the daguerreotype process, though it was made of cardboard, not metal. The tube was 3 inches in diameter and 5 inches long, plus an extension, and provided with diaphragms. (The *illustration* shows a later and larger camera of a similar type, used by Kobell and Steinheil for daguerreotype experiments. This camera is 14 inches long, diameter 4¾ inches. Lying beside it is the ground-glass and a push-on diaphragm. The full aperture of the lens is about 1:4.8.) The four photographs reproduced here were taken with the first camera, and with different masks – round and square. They are the earliest photographs taken in Germany, three of them dating from March/April 1839. The views of the Frauenkirche (Cathedral) towers, the Glyptothek, and an arcaded building in the Odeonsplatz, all buildings in Munich, were submitted as specimens accompanying Kobell's and Steinheil's report to the Academy. Steinheil's lens was surprisingly poor; the sharpness falls off rapidly from the centre. Nevertheless Steinheil remarks that "the precision far surpasses even the most accomplished (artist's) brush, and is limited only by the structure of the paper when seen through a magnifying glass." He also mentions that not all subjects are equally suitable: "Trees, lawns, and anything else green, have too weak an effect in proportions to the other colours to give clear pictures; on the other hand, all well-illuminated buildings, groups of rocks &c. give an excellent image, very true to life, so that they can serve the artist as studies." The exposure time was not given, but judging from Kobell's general remark, quoted above, cannot have been less than half an hour even for these very small pictures.

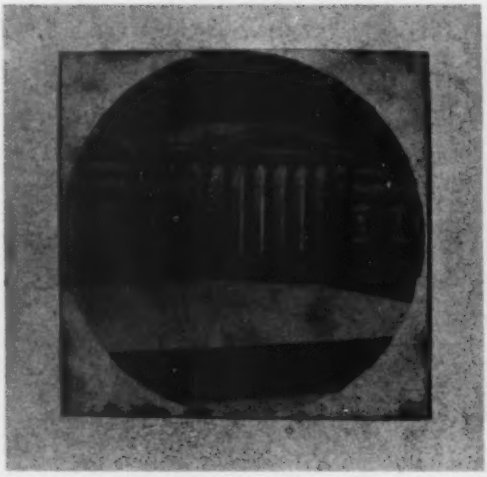
On 28 July, Kobell, at the Queen's command, demonstrated photography at the royal summer palace of Nymphenburg. It was presumably on that occasion that he

Kobell and Steinheil's Camera used for daguerreotype experiments.

took the view of one wing of the palace (which we reproduce). This picture is 41 mm in diameter; the other three have a diameter of 55 mm.

About a fortnight later Kobell and Steinheil exhibited two small photographs of the Glyptothek, of different sizes, amongst paintings at the Munich Art Society. The *Vossische Zeitung* (Berlin) reviewing the exhibition of 19 August said "they have the appearance of Chinese-ink drawings, and are interesting for their novelty and the faithfulness of the representation. These drawings are still rather imperfect, however, and do not yet satisfy their makers, who have lavished considerable trouble on them, whereas the incomparable method of Daguerre is admirable in its perfection and is bound to triumph in its practical application over all its competitors." Indeed, after reading a short description of Daguerre's method in the *Bayerische National Zeitung* on 24 August, Steinheil made two daguerreotypes which were highly praised when exhibited at the Art Society on 4 September.

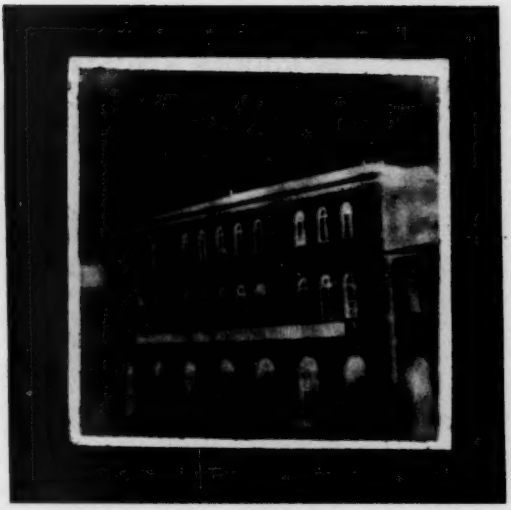
Daguerre's instruction manual was reprinted complete, with plates, in the September/October double number of the *Kunst- und Gewerbe-Blatt* in Munich, and Steinheil from now on devoted his interest to the daguerreotype process, which he obviously found preferable, and which he simplified. He constructed a miniature camera for 8 x 11 mm plates, and a fixed focus lens of 25 mm focal length. The tiny pictures were intended to be viewed through a magnifier. The camera is no longer in existence, but a description of this first miniature camera, which was much smaller than Talbot's "mousetraps" of 1835, was published in the *Münchener Politische Zeitung* on 31 December 1839, and details can be found in our biography of Daguerre[5].



Carl August von Steinheil (1801-1870) an astronomer, became professor of physics and mathematics in Munich in 1832. In spring 1837 he went to Paris at the request of King Ludwig I of Bavaria, to obtain facsimiles of the standard metre and standard kilogramme. In 1849 Steinheil organized the Austrian telegraph system; two years later he did the same in Switzerland, then was recalled to Munich, where in 1854 he founded with his son the optical firm which became famous for its introduction of the aplanatic lens in 1866.

Franz von Kobell (1803-1875) became professor of mineralogy at the University of Munich in 1826. He was also interested in the graphic arts, and published a method of making electrotypes in March 1840, and a pamphlet on galvanography in 1842.

5. *L. J. M. Daguerre*, London & New York, 1956, p. 168.



Illustrations courtesy of the Deutsches Museum, Munich.

From left to right:

The Glyptothek in Munich. March/April 1839. 55mm square.

Towers of the Cathedral in Munich. March/April 1839. 55mm square.

A wing of the royal summer residence Nymphenburg near Munich. Probably taken on 28 July 1839. 41mm diameter.

A building in the Odeonsplatz, Munich. March/April 1839. 55mm square.

NOTES ON "DEEP-FIELD" LENSES

by RUDOLF KINGSLAKE

IT IS WELL KNOWN that the depth of field of a well-corrected lens depends on the diameter of the lens aperture, and that if a camera is sharply focused on objects at a certain distance, then objects at all other distances will be more or less blurred on the film.

For many years, opticians have endeavored to find some way of overcoming the law of nature which limits the depth of field of a well-corrected lens, hoping to find some means to form equally sharp images over a wide range of object distances, although it is admitted that some loss in sharpness must necessarily accompany any increase in depth of field.

The principle on which all these attempts have been based is that if we superpose a sharp image on a blurred image, then the sharp image will be recorded more clearly than the blurred image. In the early 1900's several proposals were made to move a camera lens continuously through its entire focusing range during the exposure, so that every object in the field would be in focus for a brief period and out-of-focus for the remainder of the exposure time. The sharp image would then be recorded, superposed on a blurred image of the same object, but the sharp image would predominate. The patents of F. Stark (U. S. 751,116/1903), and U. Nehring (U. S. 756,881 and 761,390/1904), show devices for causing the lens to travel along its axis in a smooth and controlled manner during exposure, to increase the depth of field in this way.

In 1927, L. M. Dieterich undertook to apply this shifting-image procedure to a motion-picture camera. He realized at once that if the lens-to-film distance is merely varied during exposure, not only will the image of an object pass from a blur to a blur through a sharp intermediate stage, but the size of the image will change progressively throughout the exposure. He therefore made a theoretical study of the problem, and found that by moving one or more selected elements within a lens, it was possible to arrange matters so that the image would move longitudinally

without causing any variation in its lateral dimensions (U. S. Pat. 1,927,925/1927). As a result of this study, he designed an *f*/3.7 lens called the Detrar (U. S. Pat. 2025731/1933) which was constructed by the Bausch & Lomb Optical Company. In this lens an internal negative element was made to vibrate longitudinally, at first mechanically but later by means of a moving-coil loud-speaker mechanism*, at a sufficient rate to ensure that the whole range of object distances would be scanned several times during each frame of the motion picture.

A completely different approach to this problem has been made by other workers, in which objects at various distances have been imaged on the film simultaneously by different *zones* of the lens. The foci of the various lens zones are made to cover the desired range of object distances by introducing sufficient spherical aberration, or by the use of a specially-formed aspheric attachment lens which lengthens or shortens the focus of some zones relative to others. Typical of this class are the lenses of H. D. Beach (Brit. Pat. 335,696/1929; U. S. Pat. 2,101,016/1935), and of J. Dulovits (U. S. Pat. 2,233,591/1937). In both of these systems, different zones of a lens, or of an attachment for use in front of normal lens, are polished to somewhat different radii of curvature. The differences are actually very slight as the change in lens power necessary to cover the entire range of object distances from infinity to 3 feet is only just over one diopter.

The deliberate addition of a considerable amount of spherical aberration to a lens has been extensively used to give the so-called soft-focus effect for portraiture, a typical example being the Rodenstock "Imagon" lens in which the outer rays having the greatest amount of spherical aberration are controlled by a number of overlapping holes in a pair of metal diaphragms. In these lenses, the increased depth accompanying the introduction of spherical aberration is sometimes regarded as an advantage and sometimes an undesirable but inevitable accompaniment to the softening of the image. Soft-focus effects which are produced by a diffusion or random scattering of the light are not, of course, accompanied by any increase in depth.

Some opticians have attempted to obtain increased depth of field by means of a large amount of chromatic aberration, the theory being that distant objects would be imaged sharply in, say, red light, while close objects would be imaged sharply in blue light, each object distance being associated with a particular wavelength of sharp imagery. F. Weidert introduced the "Mollar" lens attachment (U. S. Pat. 1,556,982/1920) based on this principle, the device being effectively a plano-parallel plate comprising a plano-convex lens of high-dispersion glass cemented by its curved face to a plano-concave lens of low-dispersion glass, the radii of curvature and the refractive indices of the two lens elements in one wavelength being the same. The increase in depth of field due to the presence of both spherical and chromatic aberration is probably one reason why the fixed-focus landscape lens supplied on box cameras gives acceptable photographs of objects "from 6 ft. to infinity."

In all deep-field devices we have the grave problem of maintaining the quality of the image in the outer part of the field, since the elementary concept of each device is usually directed towards giving the desired imagery on the lens axis. The aberration correction over the field of view is entirely another matter.

*See *Electronics*, XV, March 1942, pp. 44-47.

BOOK REVIEWS

SOMEDAY SOMEWHERE, by Yasuhiro Ishimoto. Japan, Geibi Shuppansha. Imported by Charles E. Tuttle & Co, 1959. 164 pages, 2 foldouts. 183 reproductions, 7 in color. $12.50.

"SOMEDAY SOMEWHERE . . . everything is alive. I want to make a record of things that are living, to add my small voice to the voices they raise, but alas, I have not yet penetrated to the heart of life . . ."

This quotation from the brief statement with which Yasuhiro Ishimoto opens his book of photographs comes close, for words, to the simple honesty manifest to a heightened degree in his vision. Since his showing at the Museum of Modern Art, in May, 1953, Ishimoto has been living in Japan, photographing the ancient monuments of Japanese architecture. Though born in the United States, Ishimoto lived most of his childhood in Japan. He returned to study at the Universities of California and Northwestern, and finally settled at the Institute of Design, in Chicago, where he studied both photography and functional design. He graduated in 1952, one year after Aaron Siskind entered the Institute to teach photography in association with Harry Callahan. The sensitive selection of 183 photographs has been refined from the past seven years of the photographer's work, but does not include any of his work on architecture. The expressive content of the book represents Ishimoto's random camera work.

In the first section, titled "Somewhere," the artist puts forward a generous series of what might be called visions of *relevant isolation*. Relevant isolation, when realized, is the creative location of a pure perception in space. The photographer's precise selection from material existence announces whatever forms the nature of this space and presents a spontaneous calligraphy for the beholder's cognition, unhindered by any extraneous material associations.

In the second section, "The Beach," Ishimoto leads us through a short public repertoire of patterns, postures and suspended animations found in play and sleep among ocean bathers. The last and longest section, the "Little Ones," celebrates an intense re-enactment of human nature. The abstract language of childhood gestures tell us immediately of the habits, adventures, perils and potentialities of humanity with vivid eloquence.

Tsutomu Watanabe closes his short introduction to the book with this indirect appraisal of the position of the artist in photography who ventures to create ". . . a visual idiom which constitutes a sort of personal critique on the civilization around

him . . . Largely because of his devotion to pure art, Ishimoto has received few material awards for his achievements, and it is therefore particularly gratifying that the Geibi Shuppansha has seen fit to present this superb résumé of his camera work to date. The occasion is indeed one for rejoicing."

W. C.

THIS IS THE AMERICAN EARTH by Ansel Adams and Nancy Newhall; San Francisco, The Sierra Club, 1960; 89 pages, 82 photographs; $15.00.

THE SIERRA CLUB'S PROSPECTUS of this book caused us to expect much and to hope for even more, so that the day on which the much anticipated volume arrived still remains as a stimulating memory. We have returned to this collection of pictures again and again. Each return has been like a first encounter and we feel the experience is far from exhausted. The book seems to rejuvenate itself, for the high and discriminating standards of those who composed it have given it a vitality peculiarly its own. It stands as an impressive reminder of what the photographic book should be and no doubt it will exert a beneficial influence on many publications to come.

The inception of the book was an exhibition of the same name which Ansel Adams and Nancy Newhall organized for the Sierra Club and which became internationally famous. Of course the first attraction of the present publication is the photographs reproduced, but the aim of the entire project is the Sierra Club's admirable purpose to awaken an appreciative support of American national parks, wilderness and wild life preserves. This has been done by means of a moving combination of images and words, so that one is convinced without a consciousness of being persuaded. If this book is approached without expecting it to be a comprehensive anthology of contemporary photography or a synopsis of photography's history (which seem to be the gauges too many apply to collections of photographs and exhibitions), it is difficult to believe it could ever fail to be a notable experience. A treasury of great pictures is here; thirty sources are represented in the eighty-two photographs, the theme of the work has been unswervingly kept in mind and the editors have looked far and wide for examples to state and enrich it. We repeatedly encounter the unexpected: Francis Frith's *Colossi, Nubia,* James Robertson's *The Acropolis,* Clarence Kennedy's *Renaissance Man* (a welcome recognition of this great and too often neglected photographer of works of art), Jacob Riis' *Bandits' Roost* (at last in a worthy reproduction – who will forget, after this, the hitherto unsuspected impressionism of the clotheslines?) – these are a few of the specimens which recall traditional backgrounds of photography and join hands in a kind of shock of recognition with the noble modern compositions which dominate these pages. After closing this book for the first time the most edifying and reassuring impression one has from it is that here is proof artists have not disappeared from the face of the earth and that there are still great ones living in this contradictory age with us.

Ansel Adams has long been much concerned with the various ways of reproducing photographs and has done much to encourage their improvement. It is worth buying this book just to see what can be done with mass production picture processes. Here the photogravure plates are worthy of the individually printed photographic originals: the paper has been chosen with an artist's understanding regard for its reflectance qualities and the excellence of reproduction brings the photogravure close to the classic printmaking media. Some of these photographs would seem impossible to reproduce (after all, what is more difficult to equal than the mutative subtleties of light in a fine photographic print?) and all have been sympathetically received and satisfactorily returned to us by a mechanical medium. We have come to demand so much of mechanical reproduction that sometimes its critics seem to expect the reproduction to outdo the original. In the illustrations for this book we are shown how near the reproduction can approach its object and how important is the understanding between the engraver and the artist whose work he is interpreting.

In *This is the American Earth*, Nancy Newhall has written a poem to set off the illustrations, much as a discerning composer would provide a musical score for a film, using it to deepen and point out the truths and wonders of visual material. The poem has beauty that is full and quiet and a cumulative movement which progresses steadily through the pages to a climax of both power and serenity. Anyone who looks at the pictures alone and does not read the lines which accompany them has wasted half of the satisfaction to be derived from this book.

The spirit which animates the entire accomplishment of *This is the American Earth* gave life to the work of Emerson, Thoreau, Whitman, Melville, Thomas Wolfe. There is danger that it may disappear in our time but here it has returned to us in the visual language of the camera. It is hoped this book will penetrate to every corner of America and travel far abroad, for it does great honor to the larger values of America which still remain free of the shallow, unrewarding horrors of "togetherness."

HUGH EDWARDS
The Art Institute, of Chicago

TV AND FILM PRODUCTION DATA BOOK, by Ernest M. Pittaro. New York, Morgan and Morgan Inc., 1959. 448 pp. 132 illustrations. $6.95.

AT LAST, SOMEONE HAS WRITTEN IT. And because of its unique quality, this sorely needed technical book will probably have the success for which it vies. Mr. Pittaro's *TV and Film Production Data Book* is a must. For television and motion picture technicians, directors and producers, it gathers together in a single volume information hitherto available only from a fantastically scattered miasma of pamphlets, articles, brochures, speeches, and vague memories.

The table of contents contains some one hundred and two entries; the twelve headings which follow indicate what broad areas are discussed.

1. Videotape and Motion Picture Film
2. Television and Motion Picture Cameras
3. Special Lenses for Cameras
4. Lighting Equipment
5. Sound Recording Equipment
6. Miscellaneous Equipment (e.g. panorama and crab dollies, cranes, friction heads, variable speed motors, teleprompters, etc.)
7. Television Transmission (with sections on TV commercial standards, Kinescope recording, TV slides and opaques) and Motion Picture Projection (including a short discourse on wide-screen processes)
8. Animation Techniques and Equipment
9. Valuable Working Tables of various kinds. (e.g. lens and shutter speed, depth of field, hyperfocal distance, projection, time conversion, carrying capacity of electric wires and cables, use of various filters with film, etc.)
10. Some Equipment for Scientific and Industrial use. (e.g. Time lapse photography and High Speed Cinematography)
11. A Manufacturer's Directory – with addresses and telephone numbers. (Unfortunately, outside of the companies whose names bespeak their products, there is no indication as to what area of manufacture the remaining organizations are engaged in)
12. World Television Stations and Set Data

Generally speaking, Mr. Pittaro has exhaustively plumbed the depths of the above categories. In the broad area of equipment, he has – as a rule – described the anatomy of each and every piece. He then continues to tell us how to operate and maintain it and where (in production) each type is most useful.

In somewhat the same manner has the author treated Videotapes and Motion Picture Films. He tells us of their specific characteristics and (with film) what emulsion or type to use under various conditions. An interesting section on videotape splicing is included.

Of course, little needs to be said about the great value of the Working Tables. All kinds of usable data have been compiled – some never before published and some worked out especially for this book.

To round out this volume, there are short segments devoted to the techniques of Animation, Time Lapse Photography, and High Speed Cinematography. These, along with the Manufacturer's Directory and a compilation of World Television Stations and Set Data, are the "extras" thrown in for good measure – they really have nothing to do with basic fabric of the book. We hope that in a revision of Mr. Pittaro's work they will be deleted and the space used to introduce technical factors of the new equipment which will surely appear.

As the most comprehensive (and non-partisan) book of its kind in circulation today, it will indeed be welcomed with open arms by the thousands of people

working in the practical divisions of television and film production. For basically it instructs, and thereby (to the intelligent reader), suggests. In this and in its inclusive nature lies the book's originality.

RICHARD KILBURN
Eastman Kodak Company

THE MARCH OF PHOTOGRAPHY, by Prof. Dr. Erich Stenger. London and New York, Focal Press, 1958. 304 pp. £2.2.0.

In the 1930s, the late Edward Epstean, retired head of a photoengraving concern, began an ambitious project: the English translation of every book on the history of photography. It was his goal to make available to students in America and England standard works in a field which was then accessible only to those who could read German or French. There was nothing in English comparable to Josef Maria Eder's monumental *Geschichte der Photographie,* Erich Stenger's encyclopedic *Die Photographie in Kultur und Technik; ihre Geschichte wahrend hundert Jahren,* or Georges Potonniée's *L'Historie de la Decouverte de la Photographie.*

Just as Epstean's translation of Stenger's *History of Photography* was ready for publication, World War II broke out. Epstean faced a dilemma. Stenger was an enemy. He was also a Nazi: Heinrich Hoffmann, Hitler's personal photographer, had written an introduction to the book. Epstean, besides his hatred of the Nazis, was horrified at the chauvinism which Stenger displayed. But he had made his promise and he courageously kept it. He published a literal translation of the book at his own expense, in a small edition. He did not correct the text in any way, though it was full of errors.

After the war, Stenger, in retirement and professor emeritus at the Technische Hochschule in Berlin, revised his history and published it under the pompous title of "The Triumphal March of Photography." He added new pictures and a certain amount of new factual material.

It is this second edition which now appears in English. Epstean's translation of the first edition was used wherever possible; the little that Stenger added has been translated by H. W. Greenwood. In addition, Epstean's critical footnotes, intended for the 1938 translation, have been included.

As we pointed out in our review of the 1948 German edition (IMAGE, March, 1952), Stenger's approach is encyclopedic. He covers every conceivable phase of photography, from such epochal discoveries as the optical dye sensitization by H. W. Vogel in 1873 to the introduction in 1924 of cameras in Paris shooting galleries which automatically photograph the winner when he makes a bull's-eye. The great steps in photography share equal space with trivia. The style is swift, turgid, brief. You can find an immense amount of material in this handy-sized volume. There are discussions of applied photography: theatrical, underwater, aerial, medical, astronomical . . . There are sections on cameras, sensitive material, literature, periodicals . . . Even honors are catalogued, and the last fact in the book is that a mountain in Yosemite National Park, California, is named after a photographer — Carleton E. Watkins. This vast accumulation of facts, the fruit of years of research,

is organized loosely. There is no attempt to trace the general development of photography as a science, a technique, or an art.

It is obvious that in the attempt to cover so vast a field, errors abound. The fact that Epstean's footnotes more than once introduce further errors is most unfortunate. Thus Stenger correctly states that a vest camera was introduced by Carl Paul Stirn in New York in 1885. Epstean notes: "This was the vest camera, patented by Robert D. Gray, an American lens maker, who sold it to Stirn. It was made in Berlin and never introduced commercially in America." The camera was listed, however, in the 1888 catalogue of the Scovill Manufacturing Company of New York. Other footnotes are ridiculous. On page 165, where Stenger gives the dates of the American Civil War as 1861-62, Epstean tartly corrects him. Yet on page 227 the proper dates are given. Surely it is the duty of the translator – and editor – to proofread an author's text as well as to put it into English.

It is strange to read 20-year-old comments to a 10-year-old text. Epstean notes "In 1936, the last year for which official figures are available, over $1,800,000 worth of cameras and accessories were imported into the United States." Surely this obsolete information could easily have been updated by consulting a more recent reference.

Yet the book is so loaded with facts of the most minute kind that it is indispensable. Although Stenger gave no references to the sources of his statements, even when they are enclosed in quotation marks, he provides us with clues to all manner of information. It is a handbook, not a history; a guide, not a definitive text.

The original German edition contains illustrations from Stenger's own rich collection. It is disappointing that the translation does not contain a single one.

B. N.

PICTURE SOURCES. Helen Faye, Editor. New York, Special Libraries Association, 1959. 115 pp., $3.00.

GUIDE TO THE SPECIAL COLLECTIONS OF PRINTS AND PHOTOGRAPHS IN THE LIBRARY OF CONGRESS, compiled by Paul Vanderbilt. Washington, D. C., Reference Department, The Library of Congress, 1955. 200 pp.

THE EVER INCREASING USE of pictures in communications media during the past twenty years is, by its very nature, most apparent. The success of the picture magazines, such as *Life* and *Look*, and the advent of television, are examples of communication dependent almost entirely upon visual material. The popular and critical success of the television program, "Meet Mr. Lincoln," and the film, *City of Gold*, both made almost entirely from still pictures, is exemplary of new techniques utilizing pictorial material. The publication of *Picture Sources*, a guidebook designed especially for researchers in pictorial media, is another indication of the growing importance of pictures. The need for such a guide is underlined in its preface:

"When the Picture Division was formally established as a new Division of the Special Libraries Association in 1952, it became the pioneer organization of documentary picture librarians and specialists on a professional level. Founding members from public and private picture collections, publications, government agencies, archives, television, and advertising had long felt a need for the exchange of ideas and techniques in this increasingly important documentary picture field. All deplored the paucity of printed material and the lack of a body of information and criteria on the organization and use of pictorial materials."

Picture Sources is a very important and successful means of doing away with this lack of material. It lists 398 different sources of pictures within the United States, with a summary description of each, grouped according to their chief subject area, (history, fine, graphic and applied arts, etc.). The great collections, such as the National Archives and the Library of Congress, are approached in a separate category, as well as the important commercial agencies, and a sampling of the specialized collections. With this abundance of listings, it is possible to locate such diverse items as sod houses in Nebraska, modern treasure hunting, or an air view of Buffalo, N. Y. And if you can't find the item you want in *Picture Sources*, each of its subject categories is supplemented with a bibliographical listing of "picture-finding tools." The list following the General Picture Collections section alone lists 34 reference works of a general nature pertinent to picture sources.

That the Picture Division has fulfilled its intent there can be no doubt. They themselves look upon *Picture Sources* as a first step. Succeeding efforts should be. interesting indeed, and should do much to raise the standards of work in pictorial media.

In connection with the directory *Picture Sources*, described above, a more detailed guide to one of the nation's greatest picture collections is Paul Vanderbilt's *Guide to the Special Collections of Prints and Photographs in the Library of Congress*. This catalog is a highly detailed record of the extremely diversified material in the Library. In its lucid descriptions, references, and listings, this catalog is a model of its kind. It is a must for anyone doing research, or in any way using, pictorial sources. It is available from: Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, $1.25.

R. D.

VICTORIA R. A Biography With Four Hundred Illustrations Based on Her Personal Photograph Albums. By Helmut and Alison Gernsheim, 307 pp. New York: G. P. Putnam's Sons. $10.

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HISTORIANS OF PHOTOGRAPHY often find themselves in a state of deep depression, or exasperation, over the fact that their science did not start up a few decades earlier; and so include photographs of Napoleon, Byron, Keats and the rest of that wonderful catch they would have had, and could easily have had, if the "mystical mathematics of the Kingdom of Heaven" (as Sir Thomas Browne said) had pro-

duced an 18th century Daguerre and Talbot. But this sumptuous book before us now is a reminder that, whatever we have been deprived of, we are certainly lucky that at least photography had the grace to start in time to catch all but a few years of Queen Victoria's reign. We must also be deeply thankful that there are a few photo-historians who are not only masters of their subject but who are possessed with tenacity and pertinacity when it comes to tracking down material they seek. Helmut Gernsheim built up the finest collection of British photography in a few years after starting from scratch; he then wrote the best history of British photography; now he is dedicating himself to documentation on the grand scale. He and his wife Alison have now given us Queen Victoria; and on the grand scale it certainly is.

There are nearly four hundred illustrations, the majority of them after 1850 reproduced from photographs, as well as a generous allowance of text. The text, although very well done, with a wealth of the Queen's own words, and containing many facts and dates we want to know, is inevitably eclipsed by the illustrations. I would like here in passing to sound two deprecatory and warning notes, and get it over with. First the gravure process of reproduction was deliberately chosen for its favourable rendering of photographs: that is all very well if everyone plays the game; but the publishers and printers have not been strict enough in this case, and in many of the illustrations the dark tones have deteriorated into unified black masses and lost their detail. Secondly, the index is poor, and only includes proper names.

This book is not just a conscientious scissors and paste job. It is a careful assemblage, and an assemblage with the overriding advantage of including material in the Royal Library at Windsor. I have seen some of the Windsor material and had hoped it would be made available: its release in a book like this is very appropriate.

The Gernsheims have steered a careful course between a massive collection of portraits and a pictorial account of the Queen's reign. The Queen or her intimate circle are, of course, the subjects of nearly all the illustrations, but many show her at public ceremonies and other events. But for most of us it will, I think, be the actual portraits of Queen Victoria that form the major fascination of the series. As a passionate Victorian, it is of course inevitable that I should welcome with open arms any such thoroughgoing documentation of the *fons et origo* of the period. The interest and nostalgia is all but overwhelming. Nobody ever pretended that Victoria was a handsome woman; but she certainly had charm when she liked to exercise it, and great dignity, all of which is made very evident in this book. The authors have gathered in, among their rich harvest, the few photographs showing the Great Queen smiling, a facial achievement very rare after the death of Prince Albert in 1861. "For me," she wrote, "life came to an end on 14 December"; and indeed the pathos of the post-Albert photographs more than cancels out their sentimentality; for me, one of the most moving is the hitherto unpublished photograph of the Queen planting an oak tree in memory of the Prince Consort at Windsor in November 1862.

As may be imagined, there is a full technical account, and many items of photographic interest, such as the first photo of the Prince Consort (a Daguerreotype of March 1842), and the first photo of the Queen (a Calotype of 1844-5): a painting by Thorburn of the Prince during his last illness is of particular interest as it shows the artist "lifting" and adapting a photo of the Prince taken some time before. There is

beauty as well as interest technically, and it would be hard to find a more lovely scene than that of the Princess Royal's bridesmaids, which reminds one of *Les Sylphides.*

The extent of Queen Victoria's and the Prince Consort's own interest in photography has been the subject of much speculation. The Gernsheims unfortunately were not able to uncover much convincing evidence until after the book was published. However, they have recently discovered that evidence, and have now published the following excerpt from *The Photographic News* of January 24th, 1862:

> "As a manipulator in photography the Prince Consort was unsurpassed: in his practice of the art he was greatly assisted by his former librarian, Dr. Becker . . . We should perhaps add that Her Majesty is also a very good photographer. Certainly the art has no reason to complain of want of patronage and support from the Court; so extensive is the collection of negatives which have been taken for and by the members of the Royal family, that it is necessary to have a private printer to keep them and print them when copies are wanted."

One of our great regrets must be that none of these photographs appear to have survived, although one cannot help believing that they will one day emerge from some obscure cupboard at Windsor, Sandringham or Balmoral.

As the reader may imagine, I think this book is a wonderful achievement. It is a "must" for every library and every historian, and also for the ever-growing army of private readers who are now taking a fervent interest in the Victorian era.

CHARLES H. GIBBS-SMITH
Victoria and Albert Museum, London

KÜNSTLERISCHE FOTOGRAFIE IN DRESDEN VON DEN ANFÄNGEN BIS IN UNSERE ZEIT. Katalog und Bildauswahl Heinrich L. Nickel. Halle: Staatliche Galerie Moritzburg, 1959. 58 pages, 36 illustrations.

ON THE OCCASION of a conference on the use of photography in art history and archaeology, the Staatliche Galerie Moritzburg in Halle, East Germany, held in October and November a retrospective exhibition of 206 photographs by Dresden photographers, ranging from daguerreotypes to the work of contemporaries.

The catalogue of the exhibition contains an essay by Heinrich L. Nickel, a chronology of the history of photography, and 36 reproductions from photographs in the exhibition. Among these are a number of highly unusual photographs by little-known photographers. We were particularly impressed with a photograph of tree roots which almost seem to presage Atget by August Kotzsch (1836-1910) and a self-portrait of Hermann Krone (1827-1916) standing in the midst of his photographic equipment. Both Hugo Erfurth and Heinrich Kuhn are well represented. The contemporary work does not meet the high standards of the older work.

B. N.

QUARTERLY NOTES FROM THE GEORGE EASTMAN HOUSE

YOUSUF KARSH EXHIBITION

An exhibition of 75 photographs of celebrities by Yousuf Karsh was opened on February 15 at an Associates preview. Mr. Karsh gave an entertaining and illuminating talk to the Associates on his experiences in photographing the great and his philosophy in this specialized field. The prints, specially made by Mr. Karsh for the exhibition in sizes ranging from 16 x 20 inches to 30 x 40 inches, represent a selection from his recent book *Portraits of Greatness.* Following the George Eastman House showing, the exhibition will be circulated through the United States by the Smithsonian Institution. A duplicate exhibition is being toured through Canada by the National Gallery of Canada, and a third collection is scheduled to be shown in the Union of South Africa.

THE VANISHING WORLD: EGYPT

An exhibition of 40 photographs from the George Eastman House collection of Egypt is now on display. The photographs, taken between 1850 and 1890, record with an accuracy and conviction seldom surpassed great monuments of antiquity and scenes of 19th Century Egyptian life. The selection includes photographs taken by Maxime Du Camp on his trip with Gustave Flaubert to the Middle East from 1849 to 1851 and magnificent 16 x 20 inch contact prints from collodion negatives taken by Francis Frith in 1858. The traveling photographers of the 19th century often recorded remote parts of the world before the impact of the west and of the industrial revolution was felt. From our rich collection of photographs, we hope to present similar records and interpretations of other countries.

HAROLD E. EDGERTON EXHIBITION

A RETROSPECTIVE EXHIBITION of high-speed photography by Dr. Harold E. Edgerton of the Massachusetts Institute of Technology will open on April 21, with a joint meeting of the George Eastman House Associates and the Rochester Chapter of the Society of Photographic Scientists and Engineers. The exhibition will cover Dr. Edgerton's work in various fields photographing with the electronic flash and repeating stroboscopic light of his invention, ranging from his earliest work to his most recent undersea explorations.

FIRST GARBO FILMS

NEVER BEFORE SHOWN in the United States, the first three motion pictures in which Greta Garbo appeared have been added to the study collection and shown to audiences in the Dryden Theatre. The first short film was made in 1920 with Garbo appearing as a coat model for the Paul U. Bergstroem department store where she was then employed. The second was made in 1921, an advertising film made for the Swedish Co-operative, *Konsum*. The third film, *Luffar-Petter* was a comedy produced in 1922. Billed as Greta Gustavsson, her role in *Luffar-Petter* was her first as a film actress. The three rare films were obtained through the courtesy of Filhistoriska Samlingarna, the Swedish Film Museum in Stockholm.

MEMBERSHIP RATES

OVER THE PAST FOUR YEARS, the George Eastman House has absorbed frequent increases in the cost of printing IMAGE. It is with reluctance that we are forced to increase slightly the cost of membership to $6.00 annually.

AMERICA'S MANY FACES

EDWARD STEICHEN HAS ANNOUNCED appointments to the board of judges, of which he is chairman, for the National Urban League's "America's Many Faces" competition. They include the Director of the George Eastman House; Gordon Parks, Life magazine photographer; Harry Golden and Langston Hughes, writers, and Margaret Mead, anthropologist. The competition is open to all photographers: details are available from the National Urban League, 14 East 48 St., New York.

STAFF ACTIVITIES

THE CURATOR OF MOTION PICTURES recently lectured on films at Dartmouth College and at the University of Kingston in Kingston, Ontario.

The Director lectured at the Metropolitan Museum of Art in New York on "The Invention of Photography: challenge and opportunity."